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REPORT OF THE SECRETARY FOR 1859.

To the Board of Regents:

GENTLEMEN: I have the honor again to present to you the history of the transactions of the Smithsonian Institution for another year, and I am happy to be able, at the beginning of my report, to state that nothing has occurred since your last session to interfere with the successful prosecution of the several objects embraced in the plan of organization.

The funds of the establishment are still in a good condition: the original bequest of Smithson remains in the treasury of the United States; the extra fund which was saved from the annual income, is still invested in State stocks, which have since the last meeting of the Board considerably increased in marketable value, and could now be sold for more than was paid for them. The accumulation of half a year's income in the treasury at the beginning of last year has enabled us to pay in cash for all the materials purchased and labor performed on account of the Institution, and has thus not only been the means of a saving by reduction in the cost of the operations, but also of preventing the embarrassment and anxiety which has sometimes been felt on account of outstanding debts, besides enabling us more readily to adapt the expenditures to the several items of appropriation.

The Institution, during the past year, by its publications, exchanges, researches, &c., has sustained the reputation it had previously acquired, and has continued gradually to extend the sphere of its influence and usefulness. By its persevering efforts to carry out the will of the founder, it has succeeded in rendering familiar to the public mind in the United States the three fundamental distinctions in regard to knowledge, which must have an important bearing on the future advance of science in this country: namely, the *increase* of knowledge, the *diffusion* of knowledge, and the practical *application* of knowledge to useful purposes in the arts.

It is of the highest importance to the well-being of our race that each of these distinctions should be recognized, and that each of the processes to which they relate should receive encouragement and support.

In our country, however, they have not all met with an equal share of attention, and at the beginning of this Institution the confusion of ideas on this subject was so great that in the interpretation of the will, even by some of our prominent and enlightened men, the diffusion of knowledge was identified with its increase; and it was contended that Smithson had used the terms as synonymous, and desired by the one merely to enforce the other. But that this was not the case may be gathered from the meaning attached to these terms by the class of men to which he belonged. "While we may truly exult," says one of his eminent contemporaries,* "in the awakening of the national intellect, we must remember that *diffusion* and *advancement* are two very different processes, and that each may exist independent of the other. It is very essential, therefore, when we speak of the *diffusion* or *extension* of science, that we do not confound these stages of development with *discovery* or *advancement*, since the latter may be as different from the former as depth is from shallowness."

That the *diffusion* of knowledge has been an object of solicitude to the enlightened legislatures of almost every State in the Union is evinced by the provision which has been made for libraries, schools, academies, and colleges. The practical application of science to the useful arts has received direct encouragement from the general government by the enactment of patent laws and the establishment of the Patent Office. The fact, however, does not appear to have been so constantly before the public mind that the advance of science or the discovery of new truths, irrespective of their immediate application, is also a matter of great importance, and eminently worthy of patronage and support. The progress of society and the increase of the comfort and happiness of the human family depend as a basis on the degree of our knowledge of the laws by which Divine Wisdom conducts the affairs of the universe. He has created us with rational souls, and endowed us with faculties to comprehend in some measure the modes in which the operations of nature are effected; and just in proportion to the advance we make by patient and persevering study, in the knowledge of those modes or laws, are we enabled to apply the forces of nature to our own use, and to avert the dangers to which we are exposed from our ignorance of their varied influences.

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*Mr. Swainson. Cabinet Cyclopedia, 1834.

Nearly all the great inventions which distinguish the present century are the results, immediately or remotely, of the application of scientific principles to practical purposes, and in most cases these applications have been suggested by the student of nature, whose primary object was the discovery of abstract truth. The statement cannot be too often repeated that each branch of knowledge is connected with every other, and that no light can be gained in regard to one which is not reflected upon all. Thus researches which at first sight appear the farthest removed from useful application, are in time found to have an important bearing on the advance of art, and consequently on the progress of society. To illustrate this position, I shall take the liberty of trespassing on your time with a few instances gleaned from the history of inventions.

Astronomy was not studied by Kepler, Galileo, or Newton for the practical applications which might result from it, but to enlarge the bounds of knowledge, to furnish new objects of thought and contemplation in regard to the universe of which we form a part; yet how remarkable the influence which this science, apparently so far removed from the sphere of our material interests, has exerted on the destinies of the world! Without its guidance what would navigation have remained but a timid exploration of coasts and inlets, leaving the fairest portions of the earth to be the heritage of rude and idolatrous tribes? The steam-engine, in its improved form, is due to the laborious scientific researches of Black, Watt, and Robinson, and the new theory of heat, which is now occupying so much of the attention of the abstract physicist, has lately served to modify our views of this agent, and to develop new and important facts in regard to it which will tend to economize its power, and increase the means of rendering it more effectually the obedient slave of intelligent man.

In the year 1739, the Rev. Dr. Clayton communicated to the Royal Society his discovery of what he called the "spirit of coal," which he confined in a bladder, and showed its burning powers as it issued from a puncture in the membrane. Sixty years after this Mr. Murdock, of Manchester, applied this discovery to the purpose of illumination; and what was at first a mere object of scientific research has now become, from its almost universal employment, a necessity of civilized life.

Early in the present century Davy published an account of a discovery he had made of the effect produced on the nervous system by

the respiration of nitrous oxide, a substance due to chemical research. It was ascertained that the inhalation of the vapor of ether, another chemical product, produced a similar effect, and these facts, many years afterwards, were applied by Jackson and Morton, in our own country, for the purpose of producing insensibility to pain, and thus to relieve an incalculable amount of human misery, and to ameliorate in a measure the original curse to which our race has been subjected.

Dr. Priestley, in the course of a laborious series of investigations relative to the different kinds of air, subjected, on the 1st of August, 1774, to the heat of a burning lens (which is now, through the liberality of one of his grandsons, the property of this institution) a quantity of calcined mercury, and evolved from it a gas since known by the name of oxygen, a discovery which led to a knowledge of the composition of the atmosphere, and finally to the improvement of almost the entire circle of the chemical arts.

About the middle of the last century Franklin devoted his sagacious mind to what was deemed by some of his friends a trifling pursuit—the study of the phenomena produced by the friction of different substances when rubbed together. But from this investigation he deduced his admirable theory of electrical induction, and the fact of the action of points at a distance, on which was founded the protection of buildings from lightning, and which, with the additional discoveries of Volta, Oersted, and others, has given to the world the electrical telegraph.

These are instances of investigations commenced without any idea of immediate practical utility. They exemplify discoveries made by men who studied science for its own sake, and received no other reward than the consciousness of enlarging the bounds of human thought, while it was left to others to gather a rich pecuniary harvest from what they had so effectually sown.

"It is the destiny of the sciences," says Fontanelle, "which must necessarily be in the hands of a few, that the utility of their progress should be invisible to the greater part of mankind, especially if those sciences are associated with unobtrusive pursuits. Let a greater facility in using our navigable waters and opening new lines of communication but once exist, simply because at present we know vastly better how to level the ground and construct locks and flood-gates—what does it amount to? The workmen have had their labors lightened, but they themselves have not the least idea of the skill of the

geometer who directed them; they have been put in motion nearly as the body is by a soul of which it knows nothing; the rest of the world has even less perception of the genius which presided over the enterprise, and enjoys the success it has attained only with a species of ingratitude."

But it is not alone the material advantages which the world enjoys from the study of abstract science on which its claims are founded. Were all further applications of its principles to practical purposes to cease, it would still be entitled to commendation and support on account of its more important effects upon the general mind. It offers unbounded fields of pleasurable, healthful, and ennobling exercise to the restless intellect of man, expanding his powers and enlarging his conceptions of the wisdom, the energy, and the beneficence of the Great Ruler of the universe.

From these considerations, then, and others of a like kind, I am fully justified in the assertion that this Institution has done good service in placing prominently before the country the importance of original research, and that its directors are entitled to commendation for having so uniformly and persistently kept in view the fact that it was not intended for educational or immediately practical purposes, but for the encouragement of the study of theoretical principles and the advancement of abstract knowledge.

Smithson declares his bequest to be for the increase of knowledge and the diffusion of this among men, being well aware that a single new truth added to the general stock must affect man for good in all times and all places. We doubt not that when the importance of the abstract speculations of science is more generally and more justly appreciated, individuals who are favored by Providence with those peculiarities of mind which fit them for the advancement of science will be set apart as the priests or interpreters of nature, and be furnished liberally with the means necessary to benefit their fellow men by the discovery of new principles. The grand philosophical vision of the father of modern science, which has waited so long for its fulfilment, will then be realized, "by the union and co-operation of all in building up and perfecting" that House of Solomon, (as Bacon quaintly termed it,) "the end of which is the knowledge of causes and of the secret motions of things, and the enlarging of the bounds of human empire to the effecting of all things possible."

Publications.—The publications of the Institution are now divided into three classes: the "Contributions to Knowledge," in quarto form; the "Annual Reports" to Congress, and the "Miscellaneous Collections," in octavo.

The eleventh volume of Smithsonian Contributions is nearly ready for distribution, and will contain a number of original memoirs, which are presented to the world as additions to knowledge of sufficient importance to warrant their publication by the funds of the Institution. The fact, however, should be recollected that the Institution does not merely publish these volumes, but, as a general rule, extends its assistance to the original researches of which the papers published contain the results, sometimes by furnishing the subjects or materials of observation, and sometimes by defraying the whole or a part of the expenses incident to such researches.

The first memoir contained in this volume is on North American Oology, by Dr. Thomas M. Brewer, of Boston, an account of which was given in a previous report. The text of this work was printed in 1857, but the preparation of the plates to accompany it not being completed, it could not be included in any volume previous to the eleventh. Copies, however, of the paper had been presented separately to some of the principal naturalists of this country and Europe, and the work has been received with approbation as an important addition to the branch of natural history on which it treats.

The second paper is on the total eclipse of the sun, September 7, 1858, as observed near Olmos, Peru, by Lieutenant Gilliss, United States navy, illustrated by a plate of the appearance of the sun during the total obscuration. A full account of this paper is given in the last report of the Institution.

The third memoir in the eleventh volume has the following title: "Discussion of the Magnetic and Meteorological Observations made at the Girard College Observatory, Philadelphia, from 1840 to 1845, by A. D. Bache, LL.D." Part 1. Investigation of the eleven-year period in the amplitude of the solar-diurnal variation, and of the disturbances of the magnetic declination.

About twenty years ago the British Association organized a series of cotemporaneous magnetic and meteorological observations at different colonial positions in the British empire, with which most of the civilized governments of the world co-operated. No assistance,

however, was rendered to the enterprise in this country, except in the instance here referred to, in which the observations were conducted by Dr. Bache, at Philadelphia, by means of funds supplied by the members of the American Philosophical Society and the Topographical Bureau of the United States, and with instruments furnished by Girard College. This series of observations commenced in May, 1840, and, with short interruptions, terminated in June, 1845, thus furnishing a record extending over five years, for three or four months of which the observations were made bi-hourly, and for the remainder of the time hourly. A general reduction of these observations was published in 1847, by order of Congress, in three octavo volumes, with an atlas of diagrams. The records, however, contained facts of great interest, which, owing to the laborious duties of Professor Bache, could not then be deduced from them, and he has since renewed the investigation, with the aid of Mr. Schott, and the present paper gives an account of the first results which have thus been obtained.

To present the bearing of the interesting researches exhibited in this paper on the progress of science, it may be proper to state that the magnetic force of the earth is almost constantly disturbed, both in direction and intensity.

1. It is subject to a change which appears to complete its cycle in a large number of years, for the determination of which it is necessary to know the magnetic state of various places on the globe simultaneously at a given epoch, and again after the lapse of several years. 2. It is subjected to a change which is completed in the course of a year; and 3d, another which runs through its course in a single day.

Beside these regular disturbances, there is another series of variations, large in magnitude, denominated magnetic storms, which have been, until lately, considered as fitful, appearing to observe no law, but which were manifest over a considerable part of the earth's surface. These, however apparently irregular as to the individual instances, are in all probability, as has been shown by General Sabine, subject to a law of more frequency of occurrence in certain years.

The object of Professor Bache's paper is to investigate from the data furnished by the Girard observations, the law of recurrence of the latter disturbances. Since this has not as yet been accurately ascertained, and every independent series of observations when properly discussed is of great value in giving more precision to our

knowledge of one of the most remarkable classes of phenomena presented in the whole course of physical science, the results of this discussion cannot but be received with much interest by the scientific world.

As the magnetic needle, for example, may be considered as subjected at the same time to different forces, each tending to produce one of the variations we have mentioned, it becomes a subject of nice inquiry to eliminate the several effects, and to obtain the magnitude and period of each separately. In the case under consideration it was necessary to separate more especially the large apparently fitful variations from the regular daily ones. To effect this, the process proposed by Professor Peirce, of Cambridge, and founded on the doctrine of probabilities, was employed as a criterion in judging as to the magnitude of a disturbance which should be considered as belonging to the class under consideration, and it was finally concluded that all disturbances which exceeded 3′.64 of an arc were abnormal, and accordingly all observations differing by that amount or more from their mean monthly values were marked. Next, a new hourly mean was taken, omitting the values so marked, and each observation again examined in reference to deviations from this new mean, and so on—the last mean thus obtained for each hour during each month gave what was considered the normal daily curve.

From this it appears that the north end of the needle reaches its greatest eastern position between 7 and 8 o'clock in the forenoon, and its greatest western deviation about 1 o'clock in the afternoon.

The author next proceeds to discuss the large disturbances, and from these he deduces the fact that a principal maximum of disturbances occurs in October, a smaller one in April, and the two minima, nearly equal to each other, occur in the months of February and June.

The diurnal variation arising from the large disturbances presents one maximum and one minimum; its most prominent feature is the easterly deflection, which occurs about a quarter after 8 o'clock p. m., at which hour the maximum deflection amounts to 32″ of an arc; the great westerly deflection takes place at a quarter past 6 a. m., and on an average amounts to 14″.

These variations are compared with deductions made from similar observations at Toronto, and are found to be the same in kind, but less in magnitude.

The whole discussion clearly indicates a law of recurrence in the frequency of the large disturbances, although the period over which the observations extend was not sufficient to determine the interval. The observations, however, indicate with great precision the time of the minimum, the rate of diminution as the disturbances diminish in approaching this period, and their increase as they recede from it. The minimum thus found, of frequency of large disturbances, occurred in August, 1843.

The establishment of the elements of a law of periodicity in relation to changes of the magnetic force which, from the time they were first noticed until within a few years past, were regarded as entirely irregular, is in its relation to terrestrial magnetism a fact of importance; but the value of this is highly increased when it is found that these disturbances are connected with changes in matter foreign to our earth. To realize this, we must refer to a series of persevering observations made day by day for thirty years on the spots of the sun, by an astronomer named Schwabe, in an obscure town of Germany. This devotion to an apparently unfertile field of inquiry was finally rewarded by the discovery that the spots on the sun's disc are subject to a regular law of recurrence, and that they pass through the phases of periods of greatest and least frequency in about eleven years; but strange to say, it was afterwards announced by General Sabine that the period of recurrence of large magnetic disturbances coincides both in duration and its epoch of maximum with the period discovered by Schwabe in reference to the solar spots; that is, that at the period of greatest disturbances there occurs the maximum number of spots, and *vice versa*. The investigations of Professor Bache serve to establish this conclusion, and to furnish additional elements for a more accurate comparison. From these results it is clear that the sun exerts an influence on the magnetism of the earth which depends on the existing state of its own luminous atmosphere, affording another example to be added to other illustrations of the same truth, that scientific researches, if skilfully and perseveringly continued, will always lead to valuable results, and often to those which could not have been anticipated by any previous conceptions.

The volumes of records of the Girard observations, which present on casual examination immense series of tabulated figures in which no law or regularity is observable, when scientifically studied and properly interpreted, are thus found to yield truths of the highest

interest. Professor Bache proposes to continue his inquiries and extend his investigation to the influence of the moon and other agents on the magnetism of the earth. He has already finished a second paper on these discussions, and has a third in a state of considerable advancement. These will probably form a part of the twelfth volume of the Contributions.

The eleventh volume also contains a second series of the discussions of the physical observations made by Dr. Kane during his last voyage to the Arctic regions, the first part of which, or that relating to terrestrial magnetism, was published in the tenth volume of Contributions. This second part relates to meteorology, and was prepared for publication in the intervals of his official duties by Chas. A. Schott, esq., assistant in the United States Coast Survey, under the direction of Prof. Bache, and at the expense of the Smithsonian funds. This memoir not only forms an interesting and important addition to meteorology, which will tend to connect the name of our lamented countryman with this branch of science, but also furnishes a model for imitation, of the method in which observations of this character ought to be reduced and discussed in order that they may best subserve the advancement of science.

The following account of some of the points of the memoir and of the facts developed will probably be generally interesting and serve to illustrate its value:

The observations were made at Van Rensselaer harbor, on the western coast of Greenland, and extend over a period of two winters and a considerable part of two summers, during which the vessel was constantly frozen in the ice.

They show in a very striking manner the constant and laborious occupation of the little party in their lone abode, records having been made at every hour of the day and night during the whole period. It would be out of place in this report to give a full account of all the subjects discussed in this memoir, and I shall therefore only glance at a few of the most prominent points, referring to the paper itself for a full exposition of its more valuable contents. It consists of three parts—the first is on temperature, the second on winds, the third on atmospheric pressure. The first part, viz. that on temperature, gives the observations for every hour, from which are deduced the diurnal and annual variations of the thermometer, the influence of the different winds on the temperature, and an

analysis of the recurrence of cold periods during the winter; tables deduced from the daily observations for ascertaining the corrections required to be applied to observations made only once or twice a day in order to obtain the mean temperature of places within the arctic circle; and, finally, observations to determine the diminution of temperature with an increase of elevation.

Beside the corrected records of the motion of the air, the second part of the memoir contains the resultant direction, the average force, the mean velocity, the quantity, the frequency, and the duration of the winds. The third part contains not only the record of the pressure, but also a comparison of the mercurial and aneroid barometers, the diurnal and annual variation, the regular fluctuations of the monthly and annual extremes of pressure.

The expedition was supplied with thirty-six mercurial thermometers, four maximum and minimum thermometers, twenty-four spirit thermometers of different sizes, including two standards and a register thermometer of thirty-six inches in length. A laborious series of the different readings of these instruments, particularly at low temperatures, was made, from which have been deduced corrections to be applied to the records prepared for publication. The differences exhibited by the spirit thermometers at low temperatures was referred to the unequal contraction of colored alcohol not chemically pure. This liquid, when exposed to a great degree of cold, appeared to change its condition, the coloring matter being deposited on the sides of the tube. The lowest temperature observed during the first winter, 1853–'54, was, February 6, —66°.4; and during the second winter, 1854–'55, occurred, January 8, —65 .5.

The highest temperature observed was July 23, 1854, +51°, giving an absolute difference of 117°.4. The diurnal maximum or highest temperature of the day occurred in October and November, about one hour before noon, and in April and May, three hours after noon.

In the months of October, November, and December there are two points of low temperature each day—one at 6 a. m., and the other at about 9 p. m.; during the remaining months of the year there is one minimum during the twenty-four hours, which occurs at 1 a. m.

It was a fortunate circumstance that the observations extended over two winters, and thus gave a more exact mean for that season. The warmest month is July, the coldest March; the temperature of December, however, does not differ much from the latter. The

highest mean monthly temperature seems to occur almost exactly in the middle of July, and the lowest point would probably have been found in February if the series had been extended over several winters. The mean temperature of winter, namely, of December, January, and February, was —28°.59; of spring, —10°.59; summer, +33°.38; autumn, —4°.03. The mean temperature for the whole year was —2°.46. The temperature was always lowest during calms, and rose with the springing up of a wind from any quarter.

There is also a great regularity in the elevation of temperature during the hours of the fall of snow; on an average the sensible heat was increased during this period 7°.7. In seventeen months it snowed during six hundred and eighty hours, and rained during sixty hours.

A series of recurring periods of cold was observed, which Dr. Kane seemed inclined to consider as intimately connected with the phases of the moon, and on this point a series of elaborate investigations was made by Mr. Schott, from which it was found that in a period of six days on an average the cycle was completed, and that the lowest temperatures are reached about the time of full moon. Setting aside some small deviations in the regularity of the curves of temperature, there is not a single exception to the correspondence of the greatest cold near the epoch of full moon, and of least cold near the time of the new moon. It should be observed, however, that since, from the observations made at this Institution, the waves, as it were, of cold air which reduce the temperature of the United States, frequently begin several days earlier at the extreme west, the same coincidence as to identity of occurrence of the maximum cold with any particular phase of the moon cannot be true of all points on the surface of the earth, although the period of recurrence may, as in the case of the tides at different places, be governed by that luminary.

A series of comparative observations at the level of the sea and at the top of the mast of the brig, at eighty feet elevation, was taken during the months of August, September, and October, from which is deduced a diminution of temperature of 1° for two hundred and ten feet of elevation.

The direction of the wind was noted in the original records with reference to the magnetic points of the compass, and the mean results

determined in regard to the true north. It appears from all the observations that the true direction of the wind is from the eastward, varying in the several months northward and southward. There is but one exception, namely, in June; the wind then veers round to the westward of south. The resulting direction for the whole year is almost exactly east; in winter it is E.N.E. and in summer S.E. by S.

The greatest quantity of air which moves over the place during the year comes from a direction north of east.

The predominance of calms is a circumstance quite characteristic of this region. The number of hours of winds recorded was 3,697, and those of still weather 5,063.

The snow or rain wind is between N.N.E. and E.S.E., or from the direction of the Spitzbergen sea, and also from the opposite direction of S.S.W., or that of the upper Baffin's bay. From the northwestern quarter there was hardly any precipitation.

During the whole period there were recorded thirteen gales, with a duration of not less than two hours. They do not appear to be confined to any particular season of the year, and on the average continue about seven hours.

These records are of great interest in enabling us to ascertain whether the great storms which pass over the United States can be traced into the Arctic regions.

For observations on atmospheric pressure the expedition was provided with a mercurial barometer and two aneroids, and from a series of reductions of the observations of these instruments it is concluded that the indications of the aneroid may generally be relied on to within nearly one hundredth of an inch.

Owing to the small amplitude in the oscillations of the barometer, and the magnitude of occasional disturbances, the law of diurnal variation is apparently subject to considerable fluctuations. The principal maximum is reached about one o'clock p. m.; the evening maximum at about ten p. m., in conformity with the general law deduced from observations in the northern hemisphere. The one p. m. minimum seems to occur about three hours earlier than is indicated at more southern stations.

The average maximum height of the barometer is above the mean in the months of January, February, March, April, and May, and descends below the mean in the remaining summer and autumn months. The general law observed in other parts of the world, that the height

of the barometer is less in summer than in winter, is prominently exhibited.

The mean height of the barometer for the whole time was 29.775 inches, which is less than that for places under the tropics; and it should be stated that Van Rensselaer harbor is fourteen degrees farther north than the latitude 64° in which the height of the barometer is a minimum.

The fluctuations in the height of the barometer were greater in winter than in summer. The greatest pressure, 30.97 inches, occurred in the morning of January 22, 1855; the lowest, 28.84 inches, occurred near noon of February 19, 1854. Little change was observed in the barometer during the fall of snow.

The barometer fell during the blowing of all the winds except those from about north by east and southeast.

The observations indicate that the hottest winds are from the northeast, one-half east, and the maximum atmospheric pressure nearly east.

This memoir was referred for critical examination to Professor Peirce, of Cambridge, and Professor Chauvenet, of St. Louis.

The next memoir is by Dr. John Le Conte, of Philadelphia, and is intended to give a catalogue of the Coleoptera or beetles known to inhabit the middle and eastern portions of the great central region of temperate North America. The province here treated of includes Kansas, a portion of Nebraska, and the eastern part of New Mexico. Its eastern limit is well defined, but its other boundaries are indefinite, since it there fades imperceptibly into other provinces of the same great zoological district. The descriptions of new species are principally from specimens furnished through the Smithsonian Institution from collections made by different explorers connected with the surveys of the officers of the United States army.

Before proceeding to describe the special materials used in the preparation of the memoir, the author gives a short sketch of the results already obtained in regard to the geographical distribution of coleopterous insects in this country, illustrated by a map on which the several regions are distinguished by different colors. From this map it appears that the whole area of the United States is divided by nearly meridianal lines into three or perhaps four zoological districts, distinguished each by numerous peculiar genera and species, which, with few exceptions, do not extend into the contiguous districts.

These districts are divided into a number of provinces of unequal size, which are limited by differences in climate, and are therefore sometimes distinctly and sometimes vaguely defined.

The mode of distribution of species in the Atlantic and Pacific districts is entirely different. In the Atlantic districts a large number of species are distributed over a great extent of country; many species are of rare occurrence, and in passing over a distance of several hundred miles but small variation will be found to exist. In the Pacific district a small number of species are confined to a limited region of country. Most species occur in considerable number, and in travelling even one hundred miles it is found that the most abundant species are replaced by others, but of a similar character.

The object of the memoir is to give an account of what is known of this class of insects in Kansas, upper Texas, and Arizona, and to furnish means for facilitating the further exploration of the whole country in regard to the same animals.

This will undoubtedly be considered a valuable addition to a branch of zoology which, however insignificant it may appear to the popular mind, is not only connected with questions of interest in relation to abstract science, but also with the economical resources of the country.

The memoir, beside the colored map to which we have alluded, is illustrated by two engraved plates.

The next paper consists of the result of magnetical and hypsometrical observations in Mexico, to which is appended notes on the volcano of Popocatepetl and its vicinity.

In 1856 Baron Von Müller undertook an exploration of Mexico in reference to its natural history, and proposed to the Smithsonian Institution to make in its behalf a magnetic survey of the same country. This offer having been accepted, an appropriation was made from the Smithsonian fund to pay a portion of the salary of Mr. Sonntag, the assistant of Baron Von Müller; and the magnetic instruments which had been previously lent to Dr. Kane, and used by Mr. Sonntag himself, as one of the assistants of that lamented explorer in his last Arctic exploration, were furnished to the expedition for the contemplated survey. Several records of the unreduced observations made at a number of places in Mexico, were at different times transmitted to the Institution previous to the return of Baron Von Müller to Germany, after which nothing more was obtained; and after considerable delay

we were informed by him that he had been robbed in Mexico, and that the instruments had been captured and destroyed. Not having received a final report from Baron Von Müller, to render the observations which had been obtained from Mexico available to science, they were placed in the hands of Mr. Sonntag on his return to Washington, and have been reduced by him at the expense of the Institution. He has also appended a series of notes relative to the volcano of Popocatepetl and its vicinity, and also a series of barometrical and trigonometrical measurements of heights of various places in the vicinity of the city of Mexico. The observations included those for the declination or variation, the inclination or dip, and, lastly, those for the relative intensity of the magnetic force. A series of observations for each of these elements was made at the following places, namely, Vera Cruz, Potrero, Cocolapam, San Andres, Mirador, city of Mexico, Chalco, and Tlamacas. The average variation of the needle from the whole series of observations was about $8\frac{1}{2}^\circ$ east; at the city of Mexico it was 8° 46′ east. The average dip for the whole region was about $42\frac{1}{2}^\circ$, and for the city of Mexico 41° 26′.

The interesting fact is noted in the appendix that the southwestern wall of all the recent Mexican craters observed by the author is higher than the northeastern wall—a phenomenon probably due to the action of the trade-winds constantly impelling the ashes and cinders from the northeast to the southwest. The elevation of eleven different places was determined, including the city of Mexico and the highest peak of Popocatepetl. The former was 7,472.8 feet, and the latter 17,817.6 feet.

We regret very much the loss of the magnetic instruments, not only on account of the use which might be made of them in determining the magnetic elements of different portions of the American continent, but also on account of the interest which attaches to them from having been employed in the observations by Dr. Kane. They have, however, done good service; and although the result of the co-operation of Baron Von Müller has not been as fortunate as we could have wished, still it has added something of considerable value to our knowledge of the terrestrial magnetism of this continent.

Another memoir, which will form a part of the 11th volume of "Contributions," is on the American storm of December 20, 1836, and the European storm of December 25 of the same year, by Professor Elias Loomis, of the University of New York.

About twenty years ago this industrious meteorologist presented to the American Philosophical Society an investigation of the first of the above-mentioned storms, which extended from the Gulf of Mexico to an unknown distance to the north. The area covered by the observations, and to which consequently the investigation was confined, included only the southern part of the storm, and therefore the author regarded the results he had obtained, though of sufficient interest to warrant publication, as not entirely satisfactory. Having since obtained additional information, and adopted with success in the study of similar storms a method of investigation which consists in representing the disturbances of the atmosphere by lines and colors on charts, he concluded to review his former labors, and to publish all his results illustrated by a series of colored maps, which he is now enabled to do through the provision made for this purpose by the Smithsonian Institution.

The author first presents a summary of the observations of the barometer at each of the American stations from which information in regard to the indications of this instrument was derived. The average height of the barometer at each of the stations is given, and the fluctuations from this height during the storm, as well as immediately before and after it. With these data a series of lines is drawn on five charts, exhibiting the progress of the storm for as many successive periods, namely, for December 19, at 8 o'clock p. m.; December 20, at 8 a. m. and 8 p. m.; December 21, at 8 a. m. and 8 p. m. On each chart is drawn a line indicating the places of mean pressure of the atmosphere, or those where the pressure is in a normal condition, also a line indicating two-tenths of an inch of mercury above the mean, &c.

In examining these lines on each map, it is apparent that there exists a large area over which the barometer was below its mean height, which on the evening of the 20th of December extended 980 miles from west to east. On the morning of December 21 it extended 770 miles, and on the evening of the 21st it had become reduced to 600 miles in the same direction. It is evident, also, that toward the north the limit of low barometer extended much beyond the map, and, since the lowest point was found at Quebec, it is inferred that it extended as far north as it did south of this point, and would, therefore, be on the 21st of December at least 3,000 miles in length from north to south. The area, therefore, of least pressure was in the

form of an oval figure, having a length of three times its breadth, and, from the inspection of the several maps, it will appear that it travelled constantly eastward.

A similar table of observations is given in reference to the thermometer as observed at fifty-seven places, and lines corresponding to the mean temperature to ten degrees above and ten degrees below, &c., are drawn on each of the maps. From these it appears that on the evening of the 19th the area of greatest temperature extended from 800 to 1,100 miles in an east and west direction. The centre of this area of high thermometer did not coincide with the centre of low barometer, but was uniformly somewhat to the east of it.

On the same charts the condition of the weather at different intervals as to clearness, cloudiness, rain, &c., is represented by different colors, and from these it will be seen that on the evening of the 19th of December rain or snow was falling over the entire region west of the Mississippi as far as the map extends, and that a cloud covered the whole of the United States except that part bordering on the Atlantic ocean. On the evening of the 20th the rain had reached Washington, and on the morning of the 21st the cloud had covered the whole of the eastern portion of the country, while the sky had cleared off as far as Cincinnati, at the same time that rain was falling in the whole of New England except the State of Maine. On the evening of the 21st the storm was confined to a small portion of the eastern part of the chart, while the sky over nearly the whole United States, with a few exceptions of spots of limited extent, was free from clouds.

The direction of the wind is indicated by arrows, and its intensity shown by their length; and from these it is seen that during the entire period within the area of rain and snow the direction of the wind in the rear of the storm was from the west, northwest, or north, and that in the southwest part of the United States the winds were somewhat more northerly than in the northwest part of the country. In front of the storm the winds generally blew from a southerly point, the average of which was 10° east of south, while in the south and northern parts of the country in front of the storm the wind was easterly. There was thus along a meridian line of at least 1,200 miles in length a violent wind from a point on an average 30° north of west, and on the east side a strong current from a point 10° east of south. These two contrary winds blew with great violence for at

least forty-eight hours, indicating an ascending current of air and a tendency to rotation contrary to the motion of the hands of a watch.

The author next proceeds to offer some suggestions as to the origin of the storm, which in the main agree with the exposition of the phenomena as given in the theory of Espy, namely, the upward motion of the air at the point of lowest barometer, the evolution of latent heat by the condensation of the vapor which it contains, and the transfer eastward of the whole disturbance by the flow of the upper current in that direction. He attributes the principal cause of the cold experienced to the upper current descending to the surface of the earth.

The European storm of the 25th of December of the same year is investigated in the same manner, and the results illustrated by means of eight separate maps, one for each day, commencing with December 21, including the beginning and ending of the disturbance. It was at first supposed that this storm was a continuation of that of the 20th experienced in America; the rate of progress, however, of the latter was such that it could not have reached Europe before the 27th, whereas the storm of the 25th was fully organized on the 23d, and, indeed, its first movements can be distinctly traced in Germany on the 22d. The European storm evidently originated in Europe, and the American storm wasted itself in the Atlantic. It was, however, the possible connexion of these two storms that induced Professor Loomis to collect particularly, during a visit to Europe in 1856–'57, records of meteorological observations for this period. The whole number of stations from which he obtained data was nearly fifty.

It was mentioned in the last report that the Institution had concluded to publish in full detail several series of meteorological observations made for long periods in different parts of the United States.

The 12th volume of Contributions will contain the first of these series, by Professor A. Caswell, of Brown University. The observations commence with December 1, 1831, and end with December 31, 1859,* including a period of a little more than twenty-eight years.

These observations were made three times daily, embracing the thermometer, barometer, the direction and force of the wind, the

* These tables have been extended to June, 1860.

degree of cloudiness, the amount of precipitation, and, for a portion of the time, the psychrometer.

In addition to these fixed and regular observations, daily and special notice was taken of all phenomena connected with atmospherical changes, with storms, the aurora, &c. The barometrical observations are reduced to the level of the sea and the temperature of 32° Fahrenheit.

The author has given a series of general summaries deduced from the whole period; and when a sufficient number of similar observations for long periods are collected and published, they will be submitted to the process of exhaustive investigation similar to those to which the observations of Dr. Kane have been subjected, in order to determine peculiar points of interest relative to the climate of the United States.

We have found that the printing of papers of this character requires much time and is very expensive, since they are composed almost entirely of rule and figure work. We think, however, the value which will be attached to them will fully warrant the expenditure on account of their publication. They will afford the data for answering many questions which are propounded to the meteorologist, such as the period of recurrence of storms, the connexion of the changes of the weather with the phases of the moon, &c. The means of ascertaining the state of the atmosphere over a considerable portion of the United States on any day for the last quarter of a century will be interesting in many cases, independent of scientific considerations.

The report of the Regents to Congress for 1858, besides an exposition of the condition and operations of the Institution for that year, was, as usual, accompanied by an appendix containing the report of lectures, and other matter which has proved highly acceptable to a large number of intelligent persons in every part of the country. These reports, copies of which are especially solicited by teachers, besides furnishing valuable knowledge not otherwise readily attainable, serve to diffuse information as to the operations of the Institution which tends to increase the number of its friends and co-operators, and to elevate popular conceptions in reference to science, as well as to increase the number of its cultivators.

The number of copies of the report ordered to be printed at the last session was less than that of the preceding year, yet the supply

to the Institution was the same. Indeed it is a gratifying evidence of the public estimation in which the Institution is held, that Congress has been so favorably disposed, even during the depressed condition of the treasury, towards the distribution of this document.

It was mentioned in the last Report that the Institution had made arrangements for the preparation of elementary treatises on the different orders of insects found in North America, with a view to identify the species and facilitate the study of their relation and habits. Considerable progress has been made in this work, and several parts are either in the press or ready to be given to the printer. These treatises will afford the means of instructing the farmer in regard to the character of the insect enemies with which he has to contend, and will enable him by watching their habits, time of appearance, and mode of propagation, to add much valuable information to what is already known relative to the method of guarding against their ravages.

But before anything of this kind can be done systematically, we must be able to recognize the insects, since the same animals are known in different countries by different names. If, therefore, we would avail ourselves of the facts which have already been gathered by patient study in this branch of natural history, we must be assured of the identity of the species; and if we would make the knowledge which already exists in this country generally available, the insects must be described with that scientific precision which will enable them to be immediately recognized with certainty in every part of the world.

These treatises or catalogues will be illustrated by wood-cuts, and published as a part of the Miscellaneous Collections of the Institution.

The last Report contains a series of instructions for collecting and preserving specimens of insects, prepared by the following gentlemen, viz: Dr. John L. Le Conte, of Philadelphia; Dr. B. Clemens, of Easton, Pa.; Dr. P. Uhler, of Baltimore; and Baron R. Osten Sacken, of the Russian Legation. These instructions have not only directed attention to the subject, but furnished the means by which a large number of specimens have been obtained for scientific investigation.

It will be recollected that it is one of the objects of the Institution

to induce as many individuals as possible, in various parts of the country, to devote their leisure hours to special objects of natural history—to point out to them the pleasures derived from studies of this kind systematically pursued, and the important results which will flow from their labors when combined with those of other persons in the same line, and also to facilitate by catalogues, descriptions, and correspondence, the progress of the student in the elementary part of his studies. In connexion with this object, circulars have been distributed directing special attention to different points, among which we may mention one on American grasshoppers, an insect to the ravages of which a large portion of the United States is frequently subjected, and relative to which every well authenticated fact is of considerable interest. Another circular has been issued in regard to the collection of nests and eggs of birds, to furnish the material for a continuation of Dr. Brewer's work on Oology.

The fact was stated in a previous report that materials had been collected for a new edition of a report on the libraries of this country, originally prepared by Professor C. C. Jewett. This work was entrusted to Mr. William J. Rhees, chief clerk of this Institution, to be done out of the usual hours of his official duties; but the materials which were collected contained so much information relative to educational and other institutions, which was thought too important to be omitted, that the report when completed was found to exceed the limits assigned by the Institution; and rather than abridge it by leaving out a part of the material which had cost so much labor, Mr. Rhees offered to publish it on his own account; and such an arrangement being compatible with the general policy of the Institution, the proposition was agreed to, and the work has accordingly been issued under his own name and responsibility. It forms a volume of 700 octavo pages, and contains a large amount of very interesting and valuable matter which has cost the author a much greater amount of labor than can ever be repaid by even an extensive sale of the work.

In this connexion we may mention that a list of the libraries, societies, and institutions in North America, has also been prepared by Mr. Rhees and printed for the use of the Institution. It forms an octavo pamphlet of 81 pages, and is found of much value in facilitating the distribution of our several classes of publications and in directing circulars, &c.

Researches.—Mr. L. W. Meech has continued his mathematical researches in regard to the light and heat of the sun, and, since the date of the last Report, has succeeded in integrating some of the analytical expressions which had previously appeared likely to prove exceedingly troublesome, and the analysis is now sufficiently advanced for another publication. His next memoir will treat of the relative intensity of the sun's rays after passing through the air to the earth's surface. It will be recollected that his former memoir presented, in tables and curves, the intensity of the sun's rays at the exterior of the atmosphere. The primary formula, to be given in this memoir, has been demonstrated and verified, and the derived formulæ are mostly made out for the range and other phases of the intensity of the light and heat. These depend on what are called elliptical functions, and are much more complicated than those of the former paper. Before curves can be drawn from them, the numerical values for every five degrees of latitude are to be computed and checked, which will require the labor of several months. To defray the expense of this, another small appropriation will be required. The success of the previous labors of Mr. Meech warrants this expenditure, from funds intended for the increase of knowledge, since the results which can now be obtained from his formula will, in all probability, be considered standard elements in the physical theory of heat.

Dr. Wolcott Gibbs has continued his chemical researches, and a paper in relation to them will probably appear in the next volume of Contributions. It will present new processes for the separation of all the platinum metals in a state of absolute purity. These are very simple, and easy of execution, and not only apply to the separation, but to the quantitative analysis of mixtures of the different metals of this group in almost any proportion. The researches also involve the preparation and properties of a new and remarkable series of salts, which, it is thought, will remove the difficulties with which the subject has hitherto been surrounded.

It was stated in the last Report that one of the most important operations in which the Institution had been engaged during the previous year was the construction of a map to present at one view the arable, forest, and sterile portions of the United States. The design at first was merely to exhibit the limits or boundaries of these portions of the country, and this has been faithfully executed by Dr. J. G. Cooper, to whom the work was intrusted, as far as the materials

could be gathered from all the accessible published data, the records of the Land Office, and other sources. The facts presented at once to the eye by this map are in striking accordance, as we have before mentioned, with the deductions from the meteorological materials which have been collected at this Institution, and serve to place in a clear point of view the connexion of climate with the natural productions of different parts of the earth. The plan has, however, since been enlarged, and Dr. Cooper now proposes, with the aid of the Institution, to construct a map which shall give in detail the distribution of the several kinds of trees and shrubs found in different portions of the country; and, in view of this, he has prepared an article, which has been published and widely distributed by the Institution, containing a list of the localities of the most important and useful trees and shrubs, as far as known, and asking additional information. The chief difficulty in carrying out the plan has been the want of definite knowledge as to the locality of different plants; for example, a plant is mentioned as occurring in Virginia, but this statement is not sufficiently precise, since this State occupies a large surface, on a small portion of which only the plant may be found. Facts are also required as to the abundance of trees in a given locality.

The collection of the material for a map of this kind, in connexion with a work on the forest trees of America, still in progress by Dr. Asa Gray, of Cambridge, is a very important matter both in a political and an economical point of view, and the work might be materially aided, without much expense to the government, by appending a few additional queries to the questions propounded by the marshals who collect the statistics of the census. The outline map, which has already been prepared at the expense of the Institution, has excited much interest, and the proposition to enlarge the plan of the work has been received with commendation.

As an interesting object in regard to physical geography, and intimately connected with meterology and various branches of natural history, a commencement has been made, in connexion with the Coast Survey, in collecting materials for the construction of a hypsometrical map of the United States.

No part of the surface of the earth, of equal dimensions, has been so extensively traversed by lines of explorations for canals, railways, and river improvements, as the United States. The materials, however, which are afforded by these, for constructing a map of the ele-

vations and depressions of the surface of the country are widely scattered, and unless an effort be made to collect them will ultimately be lost. Previous to the connexion of the Institution with this enterprise, circulars were sent by the Coast Survey to engineers and directors of public works, in answer to which replies were received giving the elevation of a large number of points. Since this connexion another circular has been issued, to which a large additional number of answers have been received. The whole number of points heard from is about 9,000. Many of the replies to the circulars have been accompanied by valuable topographical information and maps, some of which, as testified by the contributors, were rescued from the oblivion which has been the fate of the records of many of the earlier surveys. For the exhibition of these points, in connexion with the topography of the country, it is proposed to have them plotted on a map consisting of two sheets, with a projection of $\frac{1}{3000000}$. One sheet is to show the surface east of the Rocky mountains, the lines of water courses, and is to be filled up from the best existing maps; the western sheet is to be copied from the map of the same scale, issued from the office of the Pacific Railroad explorations. An accurate outline map of the United States on this scale will be of great importance as a base-chart on which to delineate the result of various other statistical inquiries which have been instituted by this establishment.

Mr. Lewis H. Morgan, of Rochester, New York, having studied for several years the ethnological peculiarities of the Indians of the North American continent, has discovered among them a system of relationship which he wishes to compare with the systems of consanguinity existing among the natives of other countries, and the Institution, at his request, in order to aid in this research, has distributed circulars to our consuls, missionaries, and ethnologists in various parts of the world. The peculiar system of relationship of the Iroquois, one of the principal families of American Indians first attracted the attention of Mr. Morgan. The fundamental idea of this system, which is carried out with great logical rigor, is, that the bond of consanguinity is never suffered to lose itself in the ever diverging collateral lines—the degrees of relationship are never allowed to pass beyond that of first cousins; after that the collateral lines are merged in the lineal lines, so that the son of a cousin becomes a nephew, and the son of this nephew becomes a grandson. This principle extends upwards as well as downwards, so that the brother of a man's

father becomes his father, and the brother of his grandfather becomes also his grandfather. At first Mr. Morgan supposed this peculiar system to be confined to the Iroquois, but subsequent investigation developed the fact that the same system in its complexity and precision is common to all the Indian tribes of North America. It therefore becomes an object of interest to inquire whether the same system exists among the natives of any other country. It is proper to remark that, at the request of the Institution, General Cass, the Secretary of State, has given to this interesting inquiry the official sanction of his Department, and in a letter appended to our circular, has commended it to all the diplomatic agents of the government abroad.

Laboratory.—During the last year the laboratory has been under the direction of Dr. B. F. Craig, of this city, and, as in former years, a considerable number of specimens of the products of different parts of the country have been examined. The policy adopted from the first in regard to examinations of this kind is to furnish a report free of cost to the parties asking for the information, provided it is of general interest and immediately connected with the advance of science, and can be afforded at little expense to the Institution. If, however, the examination is required principally to promote private interests, a charge is made sufficient to cover the expense of the investigation. By the adoption of this policy, the laboratory is kept in operation by means of a small appropriation for chemicals and apparatus.

It may be proper to mention that during the year Dr. Craig has been engaged in investigations, on his own account, in the laboratory, and that Mr. J. H. Lane has made a series of experiments relative to different points connected with the Atlantic telegraph.

Magnetic Observatory.—The remaining instruments necessary to complete the equipment of the magnetic observatory established at the joint expense of the Institution and the Coast Survey were received and put into operation in the early part of the year; but as it has been found that the changes in the direction and intensity of the elements of terrestrial magnetism at Toronto, Philadelphia, and Washington are almost precisely the same, it has been considered that more important service would be rendered to the inquiries now being made in regard to this branch of physics, if the instruments were

placed in some more distant position, and it has been determined to send them to the Tortugas, a group of islands within the Gulf of Mexico, at which the United States coast survey has also a tidal station. A single instrument, however, is still to be kept in operation at the observatory to record the changes in declination and to exhibit the perturbations connected with the appearance of the aurora borealis.

Exchanges.—The general system of international exchange, which has been the subject of so much attention heretofore, continues to increase in magnitude and importance. By reference to the special report on this subject, it will be seen that the operations have been more extensive in 1859 than during any preceding year. The facilities afforded to the operations of the Institution in the department of exchanges and of natural history by various transportation express companies, as referred to in the preceding reports, have been continued throughout the year. The steamers of the North German Lloyd have carried a large amount of freight for the Institution, free of charge, between Bremen and New York, as promised by their directors, at the instance of Mr. Schleiden, minister from Bremen, resident in Washington. The steamer lines to California, consisting of the UNITED STATES MAIL CO., M. O. Roberts, President; the PANAMA RAILROAD CO., David Hoadley, president; and the PACIFIC MAIL CO., W. H. Davidge, president, transported a large amount of material for the Institution up to the expiration of their mail contract in October, when the NORTH ATLANTIC STEAMSHIP CO., I. W. Raymond, president, replaced the United States Mail Co. in the line, which has since continued the same favors. Mr. Bartlett, of New York, has offered the use of his line of ships to the west coast of South America, and the exchanges with Chili are now carried on chiefly through his vessels. The steamer Isabel, Messrs. Mordecai & Co., of Charleston, agents, has transported a number of packages for the Institution between Charleston and Key West, free of charge, and Messrs. Russell, Major & Waddel, army contractors of transportation to Utah, have also rendered valuable service in this line. The Adams Express Co., through Mr. Shoemaker, the superintendent of its southern division, has also exhibited liberality in reducing its charges greatly on heavy freights, and in carrying small parcels free of cost. It is difficult to estimate the value to the Institution of all these services. They are interesting as exhibiting a high appreciation of the mission and operations of the Institution, at the same time that they disclose a

spirit of liberality as gratifying as it is beneficial. It is believed that an amount of at least $1,500 has been saved by these free freights during the year, a sum which in effect may be considered as having been added to the income of the Institution, and thereby correspondingly increasing its means of usefulness. Acknowledgments are due to a number of persons in the United States who have assisted without charge in distributing the volumes of Smithsonian Contributions, viz: Hickling, Swan & Brewer, of Boston; D. Appleton & Co., New York; J. B. Lippincott & Co., Philadelphia; Russell & Jones, Charleston; Robert Clarke & Co., Cincinnati; and Bloomfield, Steele & Co., in New Orleans. Messrs. J. W. Raymond and Mr. W. H. Wickham, of New York, and Mr. A. B. Forbes, of San Francisco, agents of the California lines referred to above, have rendered services of a similar character.

It is gratifying to be able to repeat the statement made in previous reports, that all Smithsonian packages are allowed to pass free of duty and without examination at the custom-houses of all the civilized countries with which the Institution is in correspondence.

Library.—During the past year the plan adopted in regard to the increase of the library has been constantly kept in view, namely, to procure as perfect and extensive a series as possible of the transactions and proceedings of all the learned societies which now exist or have existed in different parts of the world. The library, in this respect, is now perhaps the first in the United States, and has increased, since the date of the last Report, not only by the addition of the current publications but by a number of new series and of volumes to complete sets hitherto imperfect.

The catalogue of the serial publications of foreign learned societies, State governments, universities, public libraries, and private parties, contained in the library, mentioned in the last report, has been published. It forms a book of 259 octavo pages and includes all the collections of the kind above mentioned, down to the middle of the year 1859. Copies of this have been sent to all the foreign societies, with a request that deficient series of volumes or parts of volumes be supplied, and that any works of the same kind which are not to be found in the catalogue be furnished from duplicates at the disposal of any of the establishments with which the Institution is in correspondence.

The distribution of this catalogue to the principal institutions of this country and abroad will not only facilitate the completion of the

design of forming as perfect a collection as possible of transactions, but will also render the library more generally useful to the cultivators of science in the United States. But the most important means of facilitating the use of a special library of this class of works will be that of the publication of the classified index of all the physical papers contained in the transactions, now in progress at the expense and under the direction of the Royal Society of London. This index is confined to papers relating to astronomy, mathematics, and general physics, and even with this restriction will include about 250,000 titles.

Professor J. Victor Carus, of Leipsic, informs us that during the last two years he has been collecting materials towards a general catalogue of zoological literature, from 1750 up to the present day, including not only all the separately published works, books, and pamphlets, but also and especially all the papers, notices, and articles contained in periodicals, the number of which is increasing every year. The titles and references will be arranged systematically, not according to the alphabet of authors, but within the classes and groups according to the alphabet of the genera, so that at a glance the whole literature of a particular genus may be found. The author calls for aid in obtaining information as to American zoological papers contained in periodicals difficult of access, and any one who can assist in this desirable object would confer a favor by forwarding to him, through the Institution, information bearing on this subject.

To assist in the same general plan of facilitating the acquisition of a knowledge of what has been done in different branches of science, the Institution has authorized the preparation of a bibliography of American botany, by Mr. Thurber, of New York, under the direction of Dr. Torrey.

Since the date of the last Report, the act amendatory of the law relating to the disposition of books intended for copyright has gone into operation. This act merely requires that one copy of every article intended to be secured to the author by copyright is to be deposited with the clerk of the district court from whom the certificate is obtained, and repeals the requirement that a copy should be presented to the library of Congress and to that of the Smithsonian Institution. All the books which have heretofore been deposited with the district clerks, and those which may be obtained in future, are to be arranged in the Patent Office, where they will form an

extensive collection, the support and preservation of which, however interesting to the bibliographer, are not in accordance with the general objects of the Smithsonian Institution, although as the means of securing evidence of title they are in strict conformity with the design of the Patent Office.

Few, comparatively, of the books which were received by the Institution under the operation of the copyright law were of any scientific value, and by far the greater number, consisting of elementary school books and publications designed especially for children, were entirely foreign to the plan of the library, and yet they have cost the Institution for postage, certificates, entries, care, &c., several thousand dollars. It now becomes a matter of consideration as to their disposition, and petitions have been received from the Washington Library and that of the Young Men's Christian Association, of this city, that they may be placed in their charge. Without expressing any opinion as to the propriety of complying with these requests, I beg to submit these propositions to the Board.

The operation of the former law of copyright illustrates the necessity of caution, on the part of the Institution, in receiving miscellaneous donations into a special collection without careful discrimination, particularly if the gift is coupled with the condition that the articles are to be perpetually preserved. Without care in this respect a large amount of trash must inevitably accumulate, which will interfere with the extension of the collection in the desired direction.

Among the special donations to the library are a series of expensive illustrated works from the Duke of Northumberland, privately printed by him as materials for the history of the county which bears his name. They include a survey of the Roman wall which was built across the north of England, a description of coins of the Roman families, some of which were found in that locality, and an account of some ancient castles which possess historical interest.

Another portion of the great work of Lepsius on Egypt has been presented by the King of Prussia, and valuable donations in the way of completing our transactions have been received from different societies.

The purchases for the library have been principally in the way of completing such transactions and of supplying such additional series as we have failed to obtain through our exchanges.

The library now contains a very large collection of the catalogues and reports of different public institutions in this country, which have been classified and arranged in a separate apartment so as to be readily accessible for statistical inquiries; and we trust that this collection will continually be enlarged by additions of the current reports, particularly those of all institutions which receive the Smithsonian publications.

Meteorology.—The arrangement between the Patent Office and this Institution in relation the collection of meteorological statistics still continues. The amount appropriated, however, by the former has been less than in previous years. The observers have very much increased in number, and are now divided into three classes—the first making records with a full set of instruments, the second with a thermometer and rain gage, and the third without instruments; all, however, reporting the state of the sky, the direction of the wind, beginning and ending of storms, and casual phenomena. All the observations which have been taken since 1854 have been reduced, and are now in the hands of the Commissioner of Patents to be presented to Congress as an Appendix to his Agricultural Report. It is presumed they will be ordered to be printed since they form an interesting part of the agricultural statistics called for by the Department of the Interior.

The several systems of observations made in different parts of the American continent have been continued and extended during the past year. Those under the direction of the Surgeon General of the United States have been made to include the new military posts of the army, and a series of investigations of much interest has been prosecuted in California by Lieut. R. S. Williamson, of the topographical corps, relative to the diurnal changes, the diminution of temperature depending upon elevation, and the extent of simultaneous barometrical fluctuations.

Observations have also been made by the following surveying and exploring parties, sent out under different departments of the government, viz:

Under the INTERIOR DEPARTMENT:

The Wagon Road Expedition from South Pass to California, under command of F. W. Lander.

The survey of the boundary between Texas and New Mexico, John H. Clark, commissioner.

Under the STATE DEPARTMENT:

The northwestern boundary survey, Archibald Campbell, commissioner.

Under the WAR DEPARTMENT:

Explorations in Utah, by Captain J. H. Simpson, U. S. A.

Explorations of the head waters of the Missouri and Yellowstone, by Captain W. F. Raynolds, U. S. A.

The Wagon Road Expedition from Walla-Walla to Fort Benton, Lieutenant John Mullan, U. S. A.

Exploration of San Juan and Upper Colorado, by Capt. J. N. Macomb, U. S. Top. Engs.

Observations for determining the rise and fall of the lake surface, by Capt. A. W. Whipple, U. S. Top. Engs.

Survey of the northern and northwestern lakes, by Capt. G. G. Meade, U. S. Top. Engs.

STATE OF TEXAS. Geological survey of the State, B. F. Shumard, State geologist.

In addition to the regular observations, the following were received by the Institution during the year 1859:

From Dr. S. P. Hildreth, Marietta, Ohio, observations for forty-two years, from 1818 to 1859, inclusive, on the barometer, thermometer, and amount of rain, with remarks on the weather.

From Professor A. Caswell, Brown University, Providence, Rhode Island, observations for twenty-eight years, from 1832 to 1859 inclusive, on barometer, thermometer, winds, rain, and remarks on the weather.

From Dr. Nathan D. Smith, near Washington, Arkansas, observations for twenty years, from 1840 to 1859, inclusive, on thermometer, rain, and remarks on the weather.

From Hiram A. Cutting, Lunenburg, Vermont, abstracts of thermometer observations, from 1848 to 1858, inclusive.

From Henry Connelly, Rigolet, Esquimaux bay, Labrador, observations on barometer and thermometer, from November, 1857, to May, 1859, inclusive.

From Abram Van Doren, Falmouth, Virginia, psychrometrical observations at Mount Langton, Bermuda, from November, 1847, to May, 1848, and from November, 1848, to March, 1850, inclusive.

From Dr. John F. Posey, Savannah, Georgia, hourly barometrical and thermometrical observations during half the day for about ten days in each month, from May, 1858, to September, 1859, inclusive.

From Queen's College, Kingston, Canada West, summary of observations for 1858.

The observations from Captain George G. Meade, noted on the opposite page, consist of fifty-eight sheets, made with full sets of instruments, on the northern and northwestern lakes, from June, 1858, to November, 1859, inclusive. The continuation of these will be of much value in regard to the climate of this region. Those from Captain A. W. Whipple were made at Oswego harbor, Detroit river, St. Clair flats, and Lake George, of St. Mary's river, for the purpose of determining the rise and fall of the lake surface, from the year 1854 to 1859, inclusive.

Between four and five thousand newspaper notices of the weather of 1859 have been cut out and preserved. Besides the papers received by the Institution, a large number of exchange papers are obtained from the office of the *Evening Star*. These two sources together furnish the means, either by original or copied articles, of obtaining popular notices of the principal changes of weather and meteorological phenomena in nearly all parts of the country. The method of preserving the scraps is to paste them on sheets arranged, not by the date of the paper, but by that of the occurrence noted. By this arrangement all notices of any storm, hot or cold terms, aurora, earthquake, or any other phenomenon, are brought together, no matter how widely apart may be the place of publication. It would be an acceptable donation if all readers, when they meet with any meteorological scrap worthy of preservation, would send the paper containing it to the Institution, or the article cut out, with the name, date, and place of publication of the paper plainly marked on the slip. Without these marks it would be sometimes impossible to identify either time or locality. The preferable mode is to send the entire paper.

A general distribution of blanks is made twice a year. In this distribution twelve blanks are sent to each observer, one for each month, to be retained for his own use, and one to be returned to the Institution.

As the registers come from all parts of the country, and arrive at different times, a number are received every day, sometimes as many as thirty or forty. A book is kept containing the names of all the observers, with their place of observation; and when the registers are received, an entry of each one is made in this book, so that, by inspection, it can be seen at any time for what months registers have

been received from each observer. A memorandum is also made of deficiencies, omissions, instruments used, discontinuance, change of address, or such other items as may be necessary for reference or to show the character of the observations. The date of the reception is marked in red ink on each register, and they are placed on shelves, those for each month being kept together. With the registers, letters are often received asking for information on meteorological and other subjects. These embrace a very wide range of inquiry, and, with the other letters received, make large demands on the time of the secretary. When a number of registers have accumulated, they are sent to Professor Coffin, at Easton, Pennsylvania, who, with his corps of assistants, makes the reductions and prepares them for publication.

Early in March, when a sufficient time is supposed to have elapsed to allow all, or nearly all, the registers for the preceding year to be received by due course of mail, an examination of the record is made, and a notice is sent to each observer, whose register for any month may not have reached us, informing him of the deficiency, and requesting that, if possible, it may be supplied.

It sometimes happens that through loss in the mail or other causes the blanks fail to reach some of the observers, and their stock, therefore, becomes exhausted before the time for the semi-annual distribution. In such cases, as soon as the Institution is informed of the fact, a new supply is forwarded.

Three forms of blanks are now distributed, corresponding to the three classes of observers: First, a large blank, marked No. 1, which contains columns for the records of the barometer, its observed height, attached thermometer, and height reduced to the freezing point; of the thermometer in the open air; the psychrometer, or wet and dry bulb thermometer; the depth of each rain and snow, with the time of beginning and ending; the direction and force of winds; the kind, amount, and motion of clouds; and also for the force of vapor and relative humidity of the atmosphere as deduced from the observations with the wet and dry bulb thermometers.

Second, a blank half the size of the former, marked No. 2, and containing all the columns which are on the first blank, except those for the barometer and psychrometer, and the deductions from them.

Third, a blank the same size as the second, marked No. 3, and

containing columns for such observations only as may be made without any instruments, viz: the amount, kind, and motion of clouds; the time of beginning and ending of rain and snow, the direction and force of wind by estimation, and general remarks on the weather. On the reverse of all the blanks is a place for remarks on casual phenomena, as tornadoes, auroras, meteors, &c.

The importance of such meteorological records as may be kept without instruments seems to be much underrated, and many persons have declined to make or continue observations unless supplied with full sets of instruments, assigning as a reason that such records can be of no value. But a little reflection will show that these observations may furnish interesting and important information. If kept daily and in all parts of the country and sent to the Institution, they would, without the aid of any other record, enable an investigator to determine the direction and rate of motion of every storm, hurricane, tornado, and thunder shower in the United States, and also the time and place of their origin and termination when these occurred within the limits of the observers.

They would enable him to mark out with accurate lines the districts most subject to these atmospheric disturbances, and those free from them or only partially visited, and also the portions of the year at which they are most or least frequent. They would enable him to ascertain the number, extent, and principal phenomena of all the auroras, earthquakes, and meteors; the occurrence of the first, last, and severe frosts, the comparative duration of clear and cloudy weather, and the prevailing winds, both surface and upper current. If to ascertain these points in the meteorology of every part of North America is important, then the keeping such records as may be made without instruments ought not to be omitted. While there are persons in every neighborhood in this country who could faithfully and accurately fill these blanks, the number who can obtain instruments and properly observe them must be comparatively limited.

Frequent applications are made to the Institution offering to record meteorological observations for a reasonable pecuniary compensation. But the policy originally adopted, on account of the want of means, of declining to pay observers, has been uniformly adhered to. To depart from this policy, while it might here and there secure an additional observer, would involve difficulties of discrimination altogether disproportionate to the advantage gained. While, however, no

pecuniary compensation is made to observers, the facilities exten ed to them, besides the reports and other documents occasionally distributed, though not expected to be a remuneration for the time and labor devoted to the subject, are still of some value. An inducement also exists in the pleasure to be derived from the study of the changes of the phenomena of nature, besides the consciousness of co-operating with many others in a system intended to advance an important branch of science.

Although the information derived from the system of observations, under the immediate direction of the Institution, is exceedingly valuable in many points, it is to be regretted that changes in the observers are so frequent. The value in determining the great question as to the periodicity of the weather and its average conditions as to heat, moisture, cloudiness, occurrence of frosts, &c., other things being the same, depend upon the length of time the series of observations have been continued, and results which may be relied upon as the element of insurance against failure of crops and disasters by storms are valuable strictly in proportion to the number of years embraced in the observations.

The reason why meteorology is not further advanced is not on account of the want of observations, but of extended series at a number of properly chosen places. From observations of this kind it is found that much of the apparent irregularity and caprice of the weather is due to our limited vision, and that by extending the records and properly studying them, many phenomena which are apparently fitful and exempt from all law will be reduced to order and periodicity.

According to Mr. Glaisher's investigations of the records made at the Royal Observatory for a long series of years, there is a rotation in the character of the weather at London about every fifteen years, the seasons growing warmer and warmer until they reach a maximum of temperature, and then gradually colder until they come to the lowest point, when they begin a new cycle of temperature. A series of meteorological tables may appear to the casual observer a mere mass of dull, uninteresting figures, yet a little study will enable us, says a popular writer of the day, to read in them the past history of "rich harvests, prosperous commerce, good health, plenty, and contentment; or, perhaps, the gloomier side of the picture, scanty crops and high prices, stagnant trade and social irritation, prevalent diseases and busy death;" and, it might be added, a still greater interest is

inspired by the prospect they afford, that in the course of time they will not only reflect the past but foreshow the future, and enable us by their timely monitions to avail ourselves of the benignity, or guard against the ravage of the coming day.

During the year 1859 a remarkable exhibition of the Aurora Borealis occurred, and special efforts have been made to collect all the reliable observations which could be obtained in regard to this phenomenon. The materials thus accumulated have been arranged and will be published in order to render them generally accessible. The occurrence of the Aurora, as is well known from the observations of Arago and others, is attended with a remarkable disturbance of the magnetic needle; and since the latter, as has been shown in the account of the paper of Dr. Bache, is connected with the spots on the sun, it would follow that the Aurora, although apparently of electrical origin, is connected with influences entirely exterior to our planet, and hence precise information as to its appearance over so wide an area as that in which it was exhibited about the beginning of September last, must be specially acceptable to the student of terrestrial physics.

Two remarkable meteors have appeared during the last year, one of which exploded near the boundary between New York and Massachusetts, and the other apparently descended to the earth either in Delaware bay or in the ocean in its vicinity. All the facts collected in regard to these mysterious visitants of our atmosphere have been referred to scientific gentlemen for critical examination, the results of which will be published either by the Institution or in the American Journal of Science.

The reduction of the current observations is continued by Professor Coffin, who is also engaged, with the assistance of the Institution, in the investigation of the winds of the southern hemisphere and in the extension of his previous researches in regard to those in the northern hemisphere.

The office duties of distributing the blanks; arranging the meteorological material and returns received from observers; of superintending the observations made at the Institution, and in assisting in the Smithsonian publications relative to meteorology, are assigned to Mr. William Q. Force, of Washington, and to his industry, ingenuity, and efficiency the system owes many improvements.

Museum.—During the year 1859 the labelling and repairing the specimens received from the Patent Office, and setting up and classifying new specimens collected by the Institution, or deposited by different government explorations, have been uninterruptedly continued under the immediate direction of Professor Baird.

The extensive series of corals collected during the United States exploring expedition have been arranged and labelled by Professor Dana, of New Haven, by whom they were originally described, and now constitute an interesting and attractive part of the general museum. We have also employed a distinguished conchologist, Mr. P. P. Carpenter, of Warrington, England, to classify and label the extensive collection of shells, and have been favored in this work with the co-operation of the principal gentlemen most distinguished in this country for their original investigations in this branch of natural history. Mr. Isaac Lea, of Philadelphia, assisted by Dr. Foreman, has named the Unionidæ; Mr. Binney, of New Jersey, the Helicidæ; Mr. Stimpson, the shells of the eastern coast of the United States; and Dr. Gould has identified the new species of the exploring expedition, and rendered aid in the classification of the collection generally. Assistance has also been rendered by Mr. J. G. Anthony, Mr. James Lewis, Dr. Newcomb, and Mr. Lapham.

A taxidermist has been constantly engaged in going over the collection. He has mounted several hundred new specimens of birds, and set up a considerable number of large quadrupeds.

According to the statement of Professor Baird, the number of entries in the record books, of additions to the museum, in the line of zoology, during the year 1859, amounts to 11,691, and the whole number of records in all the books is 37,197; but, as explained in previous reports, this number is far from exhibiting the aggregate of specimens catalogued; each entry frequently includes all the specimens of any one species received at one time from one locality, and, in some cases, embraces several hundred individual objects. It will not be too high if we estimate five specimens on the average to each entry, and we shall then have 185,985 as the aggregate of these objects now in the museum. In addition to the foregoing, there is a large collection of specimens in ethnology, botany, mineralogy, and geology.

The object of the Institution in obtaining so large a number of duplicates is, that they may be distributed for the advancement of

knowledge to persons who may be engaged in original investigations in natural history, to museums for the completion of their lists, and also to colleges for the purposes of education.

As it is not a part of the policy of the Institution to form a general collection like that of the British museum, which can only be the work of the general government, but to assist in advancing and diffusing a knowledge of the natural history of North America, we have been anxious to distribute the duplicates in such a manner as to render them subservient to the objects in view, and it is hoped that we shall begin the work of distribution within the present year. As usual, a number of young gentlemen have availed themselves of the facilities offered by the library and collections of the Institution to prosecute their researches in different branches of natural history; and in some cases, in which such confidence seemed fully justified, series of specimens have been intrusted for examination to individuals at a distance. Although the primary object of the Institution is not educational, yet the museum is arranged with especial reference to the study of the elements of different branches of science; and the distribution of the extra specimens will furnish the means of diffusing a knowledge of natural history more generally throughout the country.

Explorations.—A number of expeditions sent out by the general government have been furnished with instructions, and in some cases with apparatus for the collection of objects of natural history, and several explorations have been undertaken by individuals under the immediate auspices of the Institution. I need only mention in this place that conducted by Mr. Robert Kennicott in the regions of the Hudson's Bay territory and in Russian America. This young gentleman is assisted by the Smithsonian Institution, the University of Michigan, the Audubon Club and Academy of Sciences of Chicago, and a number of liberal-minded persons interested in natural history. His labors have been greatly facilitated by the cordial co-operation of Sir George Simpson, governor, and the other officers of the Hudson's Bay Company, to whom we are also indebted for valuable donations of specimens and records of meteorological observations.

For a detailed account of the explorations and the museum, I refer to the report of Professor Baird hereto appended.

Lectures.—The following lectures were delivered during the winter of 1859–'60:

Six lectures by Professor SAMUEL W. JOHNSON, of Yale College, on Agricultural Chemistry:

1. The Plant, its Structure and Composition.

2. The Atmosphere and Water in their relation to Vegetable Growth.

3. The Soil, as related to Agricultural Productions.

4. The Improvement of the Soil by Tillage, Drainage, Amendments, and Fertilizers.

5. The Conversion of Vegetable into Animal Produce.

6. Systems of Farm Practice Viewed in the Light of Agricultural Science; Rotation of Crops; Exhaustion and Maintenance of Agricultural Resources.

Three lectures by PHILIP P. CARPENTER, esq., of England:

1. Shells of the Gulf of California.

2. The Cuttle Fish Tribe, their Forms and Habits in the Ancient and Existing Seas; including the Paper and Pearly Nautilus, &c.

3. Crawling Shells.

One lecture by Professor HENRY COPPÉE, of the University of Pennsylvania, on Coincidences in the Conquests of Mexico.

Four lectures by Professor BENJAMIN PEIRCE, of Harvard College, Cambridge, Massachusetts:

Two on The Diversities in Mathematical Powers of Different Races and Nationalities;

Two on Comets.

Three lectures by Dr. BENJAMIN A. GOULD, of Cambridge, Massachusetts, on Chance, Probability, Accident.

Three lectures by Professor A. T. BLEDSOE, of the University of Virginia, on The Social Destiny of Man.

Three lectures by the Rt. Rev. M. J. SPAULDING, Bishop of Louisville, Kentucky, on The Elements and History of Modern Civilization.

One lecture by WILLIAM GILPIN, esq., of Missouri, on The Characteristics and Physical Geography of the Western Portion of North America.

Five lectures by T. STERRY HUNT, F. R. S., of the Geological Survey of Canada:

1. On Chemical and Physical Geology; Introduction of Geological Agencies.

2. Chemistry of the Earth's Crust.
3. Life in its Geological Relations.
4. Geology of the Metals, Mineral Springs, Metamorphism.
5. Igneous Rocks, Volcanoes, Mountain Chains.

The interest is still kept up in the lectures, although they occasionally called forth criticisms on account of the character of particular courses, which, while they are received with much interest by one class of hearers, are not in accordance with the taste of those whose pursuits or reading lie in an opposite direction.

While a large number of persons regularly attend the lectures for the sake of the advantage to be derived from them, others, and particularly young persons, attend as a mere pastime, or assemble in the lecture room as a convenient place of resort, and by their whispering annoy those who sit near them. Frequent complaints have been made on this account, and it has been suggested that it might be well to try, as an experiment, a plan similar to that adopted at the Lowell Institute, in which, as in the case of the Smithsonian Institution, free lectures are given to a promiscuous audience. To secure proper order, and to prevent the interruption of the speaker by persons arriving after the lecturer has commenced, a series of numbered tickets may be distributed at the commencement of the season, and the names of the persons who receive them entered in a book, opposite the number of the ticket; and in addition to this, the doors may be closed a few minutes after the lecture commences.

Respectfully submitted.

JOSEPH HENRY,
Secretary.

JANUARY, 1860.

APPENDIX TO THE REPORT OF THE SECRETARY.

SMITHSONIAN INSTITUTION,
Washington, December 31, 1859.

SIR: I have the honor herewith to present a report, for 1859, of the operations you have intrusted to my charge, namely, those which relate to the printing, the exchanges, and to the collections of natural history.

Very respectfully, your obedient servant,

SPENCER F. BAIRD,
Assistant Secretary Smithsonian Institution.

Prof. JOSEPH HENRY, LL.D.
Secretary Smithsonian Institution.

PUBLICATIONS.

The publications of the Institution during the past year have been as follows:

Annual Report of the Board of Regents of the Smithsonian Institution, showing the operations, expenditures, and condition of the Institution for the year 1858. One volume, 8vo., pp. 448.

An account of the Total Eclipse of the Sun on September 7, 1858, as observed near Olmos, Peru. By Lieutenant J. M. Gilliss, United States navy. 4to. pp. 24, and one plate.

Catalogue of Publications of Societies and of other Periodical Works in the Library of the Smithsonian Institution. July 1, 1858. Part 1. Foreign works. 8vo. pp. 260.

Appendix to the Catalogue of Described Diptera of North America. By Baron R. Osten Sacken. 8vo. pp. 4.

Directions for Collecting, Preserving, and Transporting Specimens of Natural History, prepared for the use of the Smithsonian Institution. Third edition. 8vo. pp. 40.

Discussion of the Magnetic and Meteorological Observations made at the Girard College Observatory, Philadelphia, in 1840, 1841, 1842, 1843, 1844, and 1845. Part 1. Investigations of the Eleven-Year Period in the Amplitude of the Solar-diurnal Variation, and of the Disturbances of the Magnetic Declination. By A. D. Bache, LL.D. Pages 22. Quarto.

Meteorological Observations in the Arctic Seas. By Elisha Kent Kane, M. D., United States navy. Made during the second Grinnell expedition in search of Sir John Franklin, in 1853, 1854, and 1855, at Van Rensselaer harbor, and other points on the west coast of Greenland. Reduced and discussed by Charles A. Schott, assistant United States Coast Survey. Pages 120. Quarto.

The Coleoptera of Kansas and Eastern New Mexico. By John L. Leconte, M. D. Pages 66, and three plates. Quarto.

Observations on Terrestrial Magnetism in Mexico, conducted under the direction of Baron Von Müller, with notes and illustrations of the volcano Popocatapetl and its vicinity. By August Sonntag. Pages 92, and one plate. Quarto.

Observations on Certain Storms in Europe and America, in December, 1836. By Elias Loomis, LL.D., professor of natural philosophy in the University of the city of New York. Pages 28, and thirteen plates. Quarto.

In addition to the preceding publications, the following are in an advanced stage of printing, and will be ready for distribution in a short time:

Catalogue of the Described Lepidoptera of North America. By Rev. Dr. John G. Morris. Octavo.

Check Lists of the Shells—land, fresh water, and marine—of North America. Octavo.

Meteorological Observations made at Providence, Rhode Island. By Prof. A. Caswell. Quarto.

Meteorological Observations made near Washington, Arkansas. By Dr. Nathan D. Smith. Quarto.

New Edition of the List of Foreign Institutions in Correspondence with the Smithsonian Institution. Octavo.

Circular in reference to the collection of facts relating to the grasshopper tribes of North America. Octavo.

Circular in reference to the collecting of nests and eggs of North American birds. Octavo.

Circular in reference to the collecting of North American shells. Octavo.

EXCHANGES.

As in previous years, a continuous increase and expansion of operations has taken place in this department. The annexed tables will give a better account of their magnitude than any general remarks on the subject. It will be sufficient to say that the number of institutions and individuals in the United States availing themselves of the Smithsonian facilities now embraces nearly all those publishing works of a scientific and literary character.

The expenses of the system of exchanges conducted by the Institution have, of course, increased with the expansion of operations, and but for the free facilities so generously accorded by various parties would have arisen to such an amount as to render it necessary to call on each of the institutions benefited for a share of the cost. This has not yet been done, except in the case of the United States Coast Survey, which has greatly exceeded all the rest in the bulk of its transmissions; but it may soon be required from other parties.

The thanks of the Smithsonian Institution for free freights of packages containing exchanges and specimens of natural history are especially due to the following companies:

The North German Lloyd steamers, running between Bremen and New York, of which Messrs. Gelpcke, Keutgen, and Reichelt, 84 Broadway, are agents. This line has carried 250 cubic feet for the Institution at a single trip, without charge.

The California steamer line, consisting of the Pacific Mail Steamship Company, between San Francisco and Panama, (as well as between San Francisco and the ports of Oregon and Washington Territory,) of which Mr. W. A. Davidge is president; the Panama Railroad Company, David Hoadley, president; from Aspinwall to New York the line at first consisted of the United States Mail Steamship Company, M. O. Roberts, president, up to the 5th of October last, when it was replaced in the route by the North Atlantic Steamship Company, I. W. Raymond, president. The agents of this line, Mr. W. H. Wickham, at New York, and Mr. A. B. Forbes, assisted by Mr. Samuel Hubbard, at San Francisco, have also been very zealous in their attentions to the interests of the Institution.

Messrs. Adams & Co., through the superintendent of the southern division, Mr. S. M. Shoemaker, of Baltimore, and the Washington agent, Mr. A. J. Falls, have very materially aided the Institution by a reduction of freights on heavy goods, and their remission entirely on small packages. This has also been done by Messrs. Wells, Fargo & Co. in California.

The line of sailing vessels between New York and the west coast of South America, belonging to Mr. Bartlett, 110 Wall street, has continued to carry our Chilean exchanges free of charge.

To Mr. Edward Cunard, of New York, the Institution is indebted for the offer to carry a specified amount of freight from New York to Liverpool by his steamers, free of charge—a privilege which has already, in part, been made use of.

The Isabel steamer, running between Charleston, Key West, and Havana, has also continued to carry packages free of charge, through the liberality of the agents, Messrs. Mordecai & Co., of Charleston.

Messrs. Russell & Jones, contractors of army transportation to Utah, and through Kansas and Nebraska, have also kindly extended the facilities of their line to the Institution.

Considering the large amount of freight which some of the above-mentioned lines transport annually for the Smithsonian Institution, it will readily be understood how much they have assisted in carrying out its objects, as, with a fixed income, the expenses of the exchanges and natural history operations conducted by the Institution would be entirely beyond its present means.

A.

Receipt of books, &c., by exchange, in 1859.

Volumes—Octavo	659	
Quarto	303	
Folio	60	
		1,022
Parts of volumes and pamphlets:		
Octavo	1,696	

Quarto	756	
Folio	88	
		2,540
Maps and charts		40
Total		3,602

Being an increase over the year 1858 of 1,062 volumes and parts of volumes. The number of separate donations amounted to 1,252.

It will be remembered that this does not include the volumes purchased for the current researches and operations of the Institution, or for the completion of such series of transactions and periodicals as could not otherwise be obtained.

B.

Showing the statistics of foreign exchanges of the Smithsonian Institution in 1859.

Agent and country.	Nos. of addresses.	Nos. of packages.	Nos. of boxes.	Bulk of boxes in cubic feet.	Weight of boxes in pounds.
1. Dr. Felix Flügel, *Leipsic*—					
Sweden	12	43	------	------	------
Norway	5	22	------	------	------
Denmark	12	36	------	------	------
Russia	38	112	------	------	------
Holland	33	90	------	------	------
Germany	31	87	------	------	------
Switzerland	294	878	------	------	------
Belgium	12	43	------	------	------
Total	437	1,311	32	440	13,327
2. H. Bossange, *Paris*—					
France	105	333	------	------	------
Italy	55	174	------	------	------
Portugal	3	8	------	------	------
Spain	6	19	------	------	------
Total	169	534	15	228	5,753
3. Henry Stevens, *London*—					
Great Britain and Ireland	151	670	------	------	------
Total	151	670	25	346	9,200
4. Rest of the World	68	220	10	40	1,200
Grand total	825	2,735	82	1,054	29,480

The great increase in the number and bulk of packages of books sent abroad during the period reported on is owing to several causes. Among these may be mentioned the fact that the table embraces the statistics of three different transmissions, rendered necessary by the accumulation of materials in the Smithsonian building. A large proportion of the works sent consisted of such publications of the United States government as the Pacific Railroad Report, the Mexican Boundary Report, the Report on Commercial Relations, the Coast Survey Report, &c.

Of the Pacific Railroad Report alone, over one hundred sets were sent, in behalf of the War Department, to the principal public libraries and societies in Europe, and more than three hundred copies of the Coast Survey Report to similar institutions. The Patent Office exchanges with parties in Europe also occupied a very large bulk.

C.

Packages received by the Smithsonian Institution from parties in America for foreign distribution in 1859.

	Number of packages.
Albany, N. Y.—	
Professor J. Hall	98
Boston—	
American Academy of Arts and Sciences	77
Society of Natural History	40
Cambridge, Mass.—	
American Association for the Advancement of Science	64
Professor Gray	15
Charleston, S. C.—	
Elliott Society of Natural History	27
Columbia, Mo.—	
Professor Swallow	17
Columbus, Ohio—	
State Agricultural Society	100
Des Moines, Iowa—	
State of Iowa	193
Georgetown, D. C.—	
College	6
New Haven, Conn.—	
American Journal of Science	12
American Oriental Society	19
Professor J. D. Dana	20
Yale College	2
Little Rock, Ark.—	
State of Arkansas	800
New York—	
New York Lyceum of Natural History	74
Philadelphia—	
Academy of Natural Sciences	325
American Philosophical Society	132
Isaac Lea	134
Dr. Joseph Leidy	30
W. Sharswood	30
Providence, R. I.—	
State of Rhode Island	6

C—Continued.

	Number of packages.
St. Louis, Mo.—	
Academy of Sciences	148
Dr. B. F. Shumard	15
Dr. George Engelmann	90
Dr. Wizlizenus	3
Washington, D. C.—	
United States Patent Office	1,344
United States Coast Survey	598
Secretary of War	245
Lieutenant G. K. Warren	40
Miscellaneous	633
Total	5,337

D.

Addressed packages received by the Smithsonian Institution from Europe for distribution in America in 1859.

	Number of packages.
Albany, N. Y.—	
Albany Institute	2
Dudley Observatory	44
New York State Library	18
New York State Agricultural Society	8
New York State Medical Society	2
Professor James Hall	7
Amherst, Mass.—	
Amherst College	15
Ann Arbor, Mich.—	
Observatory	9
Annapolis, Md.—	
United States Naval School	2
Atlanta, Ga.—	
Medical College	1
University of Georgia	1
Baltimore, Md.—	
Maryland Historical Society	7
Bloomington, Ind.—	
Indiana University	1
Boston, Mass.—	
American Academy of Arts and Sciences	64
American Statistical Association	10
Boston Society of Natural History	43
Bowditch Library	4
Historical Society	2
Prison Dicipline Society	2
Public Library	21
State Library of Massachusetts	4
Brunswick, Me.—	
Bowdoin College	9

D—Continued.

	Number of packages.
Burlington, Vt.—	
University of Vermont	7
Cambridge, Mass.—	
American Association for the Advancement of Science	15
Cambridge Astronomical Journal	19
Cambridge Observatory	42
Library of Harvard College	22
Professor L. Agassiz	32
Professor Asa Gray	19
Professor B. Peirce	8
Charlottesville, Va.—	
University of Virginia	9
Charleston, S. C.—	
Eliott Society of Natural History	10
Public Library	2
Society Library	2
Cincinnati, Ohio—	
Mercantile Library	7
Observatory	7
Public Library	1
Columbia, Mo.—	
Professor G. C. Swallow	9
Columbia, S. C.—	
South Carolina College	6
Columbus, Ohio—	
Ohio State Board of Agriculture	48
Chapel Hill, N. C.—	
University of North Carolina	1
Chicago, Ill.—	
Mechanics' Institute	7
Detroit, Mich.—	
Michigan State Agricultural Society	26
Easton, Pa.—	
Lafayette College	1
Frankfort, Ky.—	
Geological Survey of Kentucky	8
Gambier, Ohio—	
Kenyon College	9
Georgetown, D. C.—	
Georgetown College	23
Hanover, N. H.—	
Dartmouth College	10
Harrisburg, Pa.—	
State Library	1
Hartford, Ct.—	
Young Men's Institute	6
Jacksonville, Ill.—	
Illinois College	1
Madison, Wis.—	
Wisconsin State Agricultural Society	28
Historical Society of Wisconsin	8
Milledgeville, Ga.—	
Oglethorpe University	5
Montreal, Canada—	
Natural History Society	1
Natchez, Miss.—	
Public Library	1

D—Continued.

	Number of packages.
New Brunswick, N. J.—	
Professor George H. Cook	8
New Harmony, Ind.—	
Dr. D. D. Owen	5
New Haven, Ct.—	
American Journal of Science	10
American Oriental Society	8
Professor J. D. Dana	41
Professor Silliman	25
Yale College	17
Newark, Del.—	
Delaware College	1
New Orleans, La.—	
New Orleans Academy of Natural Science	31
University of Louisiana	2
Newport, R. I.—	
Redwood Library	1
New York—	
American Ethnological Society	7
American Geographical and Statistical Society	37
American Institute	8
Astor Library	3
Mercantile Library Association	7
New York Lyceum of Natural History	29
Oregon city, O.—	
University of Oregon	1
Philadelphia, Pa.—	
Academy of Natural Sciences	105
American Philosophical Society	67
Central High School of Philadelphia	6
Franklin Institute	17
Historical Society of Pennsylvania	1
Pennsylvania Institute for the Blind	
Philadelphia College of Pharmacy	
Philadelphia Library Company	11
University of Pennsylvania	1
Wagner Free Institute	10
Isaac Lea	16
Dr. John Leconte	5
Dr. Joseph Leidy	19
William Sharwood	13
Princeton, N. J.—	
College of New Jersey	2
Providence, R. I.—	
Brown University	8
Richmond, Va.—	
State Library	1
Rochester, N. Y.—	
University	1
San Francisco, Cal.—	
California Academy of Natural Sciences	23
Geological Survey of California	1
Savannah, Ga.—	
Georgia Historical Society	1
St. Louis, Mo.—	
St. Louis Academy of Science	70
University	11
Dr. B. F. Shumard	5
Dr. George Engelmann	7

D—Continued.

	Number of packages.
Santiago, Chile—	
University of Chile	6
Observatory	1
Springfield, Ill.—	
Illinois State Agricultural Society	1
Tallahassee, Fla.—	
Public Library	1
Toronto, Canada—	
Canadian Institute	4
Tuscaloosa, Ala.—	
University of Alabama	1
Washington, D. C.—	
President of the United States	1
United States Patent Office	72
Ordnance Bureau	3
Light-house Board	11
United States Coast Survey	3
Professor Bache	44
National Observatory	27
Lieutenant Maury	54
Secretary of War	3
Commissioner of Indian Affairs	1
Surgeon General	3
Congress Library	15
Lieutenant J. M. Gilliss	31
National Institute	3
Waterville, Me.—	
Waterville College	1
Worcester, Mass.—	
American Antiquarian Society	6
Individuals not mentioned above	246
Miscellaneous societies, &c., not mentioned	76
Total	1,933

MUSEUM.

ADDITIONS TO THE MUSEUM.

Extensive as were the additions to the museum in 1858, (exclusive of those transferred from the Patent Office,) those of 1859 have exceeded them in magnitude and extent. The number of separate donations amounted to 301, (127 in 1858,) embracing nearly 500 different packages. A detailed list of these donations will be found at the end of this report, to which I would refer, and I will proceed here to mention more in detail such of the collections received as from their importance appear to require it.

As heretofore, most of the large collections were received from officers in charge of parties under different departments of the government. Although the number of these parties has not been as great as in some other years, the results attained by them are in no way inferior in importance.

EXPLORATIONS UNDER THE WAR DEPARTMENT.

1. *Construction of wagon road from Walla-Walla, Oregon, to Fort Benton, under Lieutenant John Mullan, U. S. A.*—This expedition, with Dr. Mullan as medical officer, went to California in the spring, by steamer, and thence to Walla-Walla, the starting point. Supplies were sent up the Missouri by the steamers of the American Fur Company of St. Louis, one of which made the first trip through to Fort Benton. The supplies were accompanied by Mr. John Pearsall, an assistant of Lieutenant Mullan, who made large collections of nests, eggs, birds, insects, and fossils. Collections were also made by Lieutenant Mullan, between Walla-Walla and his winter camp, near Fort Owen, not far from the Bitter Root valley, where he was established at the last advices.

2. *Exploration of the Upper Missouri and Yellowstone, under Captain J. W. Raynolds, U. S. A.*—This expedition, accompanied by Dr. Hayden as geologist and naturalist, went up the Missouri in the steamboat of the Fur Company, in June last, and disembarked at Fort Pierre. From this starting point they proceeded across to the Yellowstone, at Fort Sarpy, and thence, after various lateral explorations, to their winter quarters on Deer creek, at the crossing of the Platte, about 100 miles west of Fort Laramie, and in the immediate vicinity of the Upper Platte Indian agency, in charge of Major Twiss. During the winter, excursions have been made in different directions for the purpose of geological explorations, and large collections secured in all departments of natural history. The collections received in Washington from Captain Raynolds consist mainly of the zoological series gathered up to the arrival of his party at Fort Sarpy, and embrace specimens of birds, eggs, insects, &c.

3. *Exploration of the San Juan river and Upper Colorado, under Captain J. N. Macomb, U. S. A.*—This party, accompanied by Dr. Newberry as geologist and naturalist, did not get into the field until a late period in the summer, and returned before winter to the east. The principal results of the expedition, independently of interesting geographical discoveries, are to be found in the department of geology, in which Dr. Newberry was enabled to extend his observations made while on the Colorado expedition under Lieut. Ives. Among other fossils, Dr. Newberry obtained remains of a new genus and species of extinct lizard, larger than any formerly found in North America.

4. *Explorations with the army in Utah, under Captain Simpson, U. S. A.*—This party, under Captain Simpson, accompanied by Mr. Charles S. McCarthy as collector, left Fort Leavenworth for Camp Floyd, in May, 1858, reaching its destination in September. From this time until March, 1859, the party was occupied in making roads between Camp Floyd and Fort Bridger, and in marking reservations. From May to August, 1859, Captain Simpson explored two wagon road routes between Camp Floyd and Genoa, in Carson valley, which shorten very much the distance from Salt Lake City to California.

As much of this region had never been before traversed by scientific men, the results were very interesting, consisting of several new and peculiar forms of fishes, as also of reptiles, insects, &c. Many rare birds, with their eggs, were also procured.

The party left Camp Floyd for Leavenworth in August, by way of the Timpanogos, the Uintah mountains and the valley of the Green river.

In addition to large zoological collections made by Mr. McCarthy, Mr. Engelmann, the geologist of the expedition, made some important geological discoveries, and brought in many fossils and plants.

UNDER THE STATE DEPARTMENT.

5. *Survey of the northwest boundary: Archibald Campbell, esq., commissioner.*—This expedition, with Dr. Kennerly as the surgeon and naturalist, and Mr. George Gibbs as geologist, has already been referred to in previous reports. These gentlemen have continued to make large collections during the year, those received filling twelve boxes. The specimens gathered about the Chiloweyuck depot proved particularly interesting, from including a new salmon, *Anodonta*, and other species of animals. The collections also embrace skins and skulls of the *Aploceras montanus*, or Rocky mountain goat, the only ones known in American collections; also of *Lagomys princeps*, or little chief hare, and skins of *Lagopus leucurus*, the white-tailed ptarmigan, and of the black-throated diver, *Colymbus arcticus*, in adult summer dress.

UNDER THE NAVY DEPARTMENT.

6. *Exploration of the Parana and its tributaries, under Captain T. J. Page, U. S. N.*—This survey, in continuation of that prosecuted

by Captain Page several years ago, is accompanied by Mr. Christopher Wood as taxidermist, and has already sent home quite a large collection of birds, embracing several rare and perhaps new species.

UNDER THE INTERIOR DEPARTMENT.

7. *Wagon road from El Paso to Fort Yuma, under Colonel Leech.*—This expedition returned to Washington in 1858, but the collections did not arrive until early in 1859. These were made by Dr. S. Hayes, and consisted chiefly of a large and valuable herbarium, embracing several new species of plants.

8. *Wagon road from the South Pass to California, under Colonel F. W. Lander.*—This party passed so rapidly over the country as to be unable to do much in the collecting of specimens of natural history. Mr. James A. Snyder, who had charge of this department, among other duties, succeeded in obtaining specimens, both in skin and in alcohol, of the very rare *Lagomys princeps*, or "coney" of the Mormons. These were captured in the Wahsatch mountains, to which, according to Colonel Lander, they appear to be chiefly confined.

IN CONNEXION WITH THE SMITHSONIAN INSTITUTION.

9. *Exploration of the vicinity of Fort Tejon and of Cape St. Lucas, by Mr. John Xantus.*—Among the very important researches in the natural history of America, the explorations of Mr. John Xantus deserve particular mention. In previous reports, the collections made by Mr. Xantus at Fort Tejon have been referred to. During a residence there of about sixteen months, from the summer of 1857 to the autumn of 1858, although constantly occupied with official duties, he has exhausted the natural history of the vicinity of the fort in the most thorough manner. All departments are fully represented in his collections, which filled thirty-five boxes; the birds alone embracing nearly 2,000 specimens and 144 species.

Professor Bache, the Superintendent of the United States Coast Survey, having determined to establish a tidal station at Cape St. Lucas, Lower California, Mr. Xantus was placed in charge, and reached the Cape in April last. He has since that time made, in the intervals of his official duties, and forwarded to Washington, collections which vie in thoroughness with those of Fort Tejon, and exceed them in number of species, embracing as they do the marine as well as the fresh water and land forms. Of 42 species of birds first received from him, 8 are new; of crustaceans, there are over 100 species, many of them new; while in all other departments the collections have been proportionately great.

The results obtained at Cape St. Lucas by Mr. Xantus add another to the many benefits to natural history as well as to physical science rendered incidentally by the operations of the United States Coast Survey, as shown previously in the important collections of Lieutenant Trowbridge, Mr. Würdemann, Mr. Cassidy, Mr. Wayne and others.

10. *Explorations of the Hudson's Bay Territory, by Mr. Robert Kennicott.*—Mr. Kennicott, under the patronage of the Smithsonian Institution, and by the assistance of the University of Michigan at Ann Arbor, the Audubon Club of Chicago, the Chicago Academy of Sciences, and a number of gentlemen interested in the natural history of the Arctic regions, has been during the past year engaged in an exploration of the north, which promises results of no ordinary importance. His labors have been greatly facilitated by the cordial cooperation of Sir George Simpson, governor of the territory, and the officers of the service, especially of Mr. Barnston, of Michipicoten, and Mr. B. R. Ross, of Fort Simpson. Mr. Kennicott left in May for Lake Superior, *via* Toronto and Collingwood. From Fort William, on Lake Superior, he was conveyed to Norway House in the Company's boats, and thence towards Fort Simpson, on the Mackenzie. At the latest advices, of July 29, he had reached Methy or La Loche Portage, and, in company with Mr. Ross, it was his expectation to proceed in a few days to Fort Simpson, there to winter. He intends in the spring to go to Great Slave or Bear Lake to collect eggs, and hopes to remain long enough in the north to spend another spring and summer on the Youkon of Russian America, and another on the shores of the Arctic ocean, north of Great Bear Lake.

A small portion only of the collections made by Mr. Kennicott have yet reached Washington; those gathered between Norway House and Portage La Loche having arrived at Pembina too late to come down this year. Among the specimens received, however, is a fine skin of the rare *Larus Sabini*, or the fork-tailed gull, shot on Lake Winnipeg.

Mr. Kennicott was accompanied to Lake Winnipeg by Mr. Charles A. Hubbard, of Milwaukie, who returned home in the fall, by way of Fort Garry and Pembina, from whom the Institution received a valuable collection of eggs, and through him, from Mr. Donald Gunn, a number of birds and of specimens in alcohol.

11. *Explorations on the Saskatchewan, by Captain Blakiston, R. A.*—The Institution has also received some interesting collections made on the Saskatchewan, by Captain Thomas Blakiston, R. A., through the Royal Artillery Institution at Woolwich, London. These consist of eggs and skins of birds, several of the former of which are rare and new to our museum.

Dr. Rae, the celebrated Arctic traveller, presented to the Institution specimens of *Spermophilus parryi* from Repulse bay, latitude 56° 30′ north, thus supplying an important addition to the collection of North American mammals.

12. *Various other points on the west coast.*—Other collections of interest consist of nests, eggs, and skins of birds, and of other animals from Fort Umpqua, sent by Dr. Vollum; of skeletons of the sea otter, by Mr. R. W. Dunbar; of specimens in alcohol, by Mr. Alexander Taylor; and of eggs, by Dr. C. A. Canfield.

13. *Explorations of Fort Crook, by John Feilner, esq.*—Mr. Feilner during the past year has made large collections of birds and mammals at Fort Crook, rivalling those of Mr. Xantus at Fort Tejon.

Among them are good specimens of such rare birds as *Picus williamsoni, albolarvatus, thyroideus, &c.*

14. *Exploration in the Rocky mountain region.*—In addition to the government collections of Captain Simpson and Captain Macomb, Dr. Anderson, U. S. A., has continued to send a number of rare birds from Cantonment Burgwin. Dr. Irwin, U. S. A., at Fort Buchanan, has also made large collections for the Institution, none of which, however, have yet been received except one box of birds. Dr. George Suckley, U. S. A., while accompanying a detachment of troops from Leavenworth to Camp Floyd, made some interesting collections, including the eggs of the Rocky mountain plover. Several rare animals have also been received from Colonel Vaughan, Indian agent for the Blackfeet, near Fort Benton.

Dr. Brewer, U. S. A., presented to the collection, through Captain J. H. Simpson, some rare reptiles and shells from southern Utah.

15. *Explorations in and near Florida.*—Dr. H. Bryant and Mr. William Cooper spent the winter in the Bahamas chiefly in and about Nassau, and made rich collections of animals, series of which were presented by them to the Institution.

Dr. J. G. Cooper visited Key West in March, and thence proceeded to Cape Florida, where he spent two months, and another month on Indian River and the St. John's. In addition to extensive zoological collections, Dr. Cooper paid particular attention to the trees of Florida, and succeeded in obtaining several West Indian and tropical species not previously known to occur in the United States.

A large number of marine animals in alcohol, and of birds and their eggs, were collected at the Tortugas for the Institution by Captain Woodbury, U. S. A., and by Dr. Whitehurst.

Dr. Bean, of Micanopy, Florida, has also furnished a collection of the eggs, reptiles, and fishes of the State. Among the first are the only eggs of the glossy ibis, *Ibis ordii*, yet detected within our limits.

In connexion with Florida explorations, with which he was so closely associated, it is my painful duty to mention the death, during the past year, of Mr. Gustavus Würdemann, a tidal observer of the United States Coast Survey, and for many years an active correspondent of the Smithsonian Institution. Occupied with the important scientific duties incident to his place in the Coast Survey, Mr. Würdemann yet found time for attention to natural history; and at his different stations, of St. Joseph's islands, Texas; Calcasieu, Louisiana; Fort Morgan, Alabama; and Key West, Tortugas, Indian Key, Key Biscayne, Charlotte Harbor, &c., Florida, made collections which have proved of the greatest service in supplying information concerning the zoology of the Gulf region. Independently of the many new and little known crustacea, shells, and other marine animals collected by Mr. Würdemann, he succeeded in adding several species of birds to the fauna of the United States; among others, *Larus cucullatus, Certhiola flaveola, Quiscalus baritus, Corvus Americanus var. floridanus, Ardea Würdemanni, &c.*

16. *Miscellaneous localities.*—A collection of eggs and birds of Illinois was received from Mr. Tolman; of insects and reptiles of

Kansas, from Mr. H. Brandt; and of eggs, reptiles, and shells, from St. Charles's College, Louisiana. Mr. Theodore Gill, during a vist to Newfoundland, obtained a collection of fishes and invertebrates for the Institution. Mr. Willis, of Halifax, has also furnished valuable collections of eggs and shells. For a statement of many other important additions to the Smithsonian Museum from private sources, I beg leave to refer to the list hereunto appended.

17. *Other parts of the world.*—A series of skins of the tropic-birds, and of eggs of birds breeding on the Bermudas, has proved of much interest for comparison with North American. These were presented by Chief Justice Darrell; a collection of fishes and reptiles from Nicaragua, presented by Dr. H. C. Caldwell, United States navy, embraced several species new to the Smithsonian collection. Mr. McLeannan, of the Panama Railroad Co., has presented to the Institution many species of birds taken on the Isthmus not before in the museum. Captain Dow, of the same company, has also supplied a pair of living curassows.

18. *Miscellaneous collections.*—One of the most important additions to the museum during the year has been made by Mr. William Stimpson, embracing, among other specimens, the whole of his collection of shells of the Atlantic coast, including the types of his "shells of New England," and the "marine invertebrates of Grand Manan." A large portion of the collection consists of specimens in alcohol, of many species, the animals of which are almost entirely unknown elsewhere.

With this collection and that of the exploring expedition, and other parties from the west coast, the Smithsonian Institution has within its walls the best single collection extant of the marine shells of North America.

Dr. Jan has presented, on the part of the Museo Civico, Milan, of which he is director, a large number of species of snakes, for the most part types of his great work on serpents.

From the zoological museum of the University of Copenhagen, Dr. J. J. Steenstrup, director, the Institution has received types of various species of radiates, crustacea, &c., described by C. F. Lütken, Dr. H. Kroyer and others.

WORK DONE IN CONNEXION WITH THE COLLECTIONS.

Much progress has been made during the year in putting the specimens already exhibited in the museum in order, in adding additional ones, and in properly labelling and arranging the whole. So much, however, is required to be done, that it is not to be wondered at if the amount actually accomplished is not at first fully realized by the visitor. The taxidermist has completed the change of stands of all the mammals and of the North American birds on the south side of the hall, and is now engaged on the exotic birds. He has also mounted several hundred birds, chiefly from fresh specimens, for the purpose of exhibiting deficient species of more special interest.

A considerable number of large quadrupeds have also been

mounted and put in place—such as two grizzly bears, a cinnamon bear, an antelope, a pair of mule deer, several wolves, &c.

The labor of cataloguing, entering, and arranging the collections has also been diligently continued during the year, as shown by the accompanying table. Much assistance in this has been derived from the voluntary services of Mr. Robert Kennicott, Mr. E. Coues, Mr. Prentice, Mr. A. J. Falls, and others.

Table exhibiting the entries in the record books of the Smithsonian Museum in 1859, *in continuation of previous years.*

	1851.	1852.	1853.	1854.	1855.	1856.	1857.	1858.	1859.
Mammals	.....	114	198	351	1,200	2,046	3,200	3,226	3,750
Birds	.....	.....	.....	4,353	4,425	5,855	8,756	11,390	15,913
Reptiles	.....	.....	.....	.....	.....	106	239	4,370	4,616
Fishes	.....	.....	.....	.....	.....	155	613	1,136	1,740
Skeletons and skulls	911	1,074	1,190	1,275	2,050	3,060	3,340	3,413	3,650
Eggs of birds	.....	.....	.....	.....	.....	.....	.....	1,032	2,525
Crustacea	.....	.....	.....	.....	.....	.....	.....	939	939
Mollusks	.....	.....	.....	.....	.....	.....	.....	.....	2,000
Radiates	.....	.....	.....	.....	.....	.....	.....	.....	1,100
Fossils	.....	.....	.....	.....	.....	.....	.....	.....	172
Minerals	.....	.....	.....	.....	.....	.....	.....	.....	793
Total	911	1,188	1,388	4,979	7,675	11,222	16,158	25,506	37,197

The actual number of entries during the year amounts to 11,691, being the difference between the aggregates of 1858 and 1859, and 2,343 more than the entries of 1858. As explained in previous reports, these numbers are far from exhibiting the aggregate of specimens catalogued, except in the case of mammals, birds, and osteological preparations.

Each entry generally includes all specimens of the same species received at one time from a given locality, and may embrace hundreds of individual objects. Thus in the oological catalogue, one number covers 242 eggs of the white ibis, *Ibis alba*, received from Dr. Bean. In a similar manner one entry of shells may embrace hundreds or even thousands of specimens. It will not be too high an estimate, probably far below it, to assume 5 specimens as the average to each number, making 185,985 as the aggregate of objects entered on the record books.

At the present time there remain to be catalogued as many, probably, as 10,000 jars of fishes and other alcoholic specimens, independently of the entire series of the crustacea, radiates, &c., collected by the North Pacific and Behring Straits Expedition; the fishes of the Wilkes Exploring Expedition, in the hands of Professor Agassiz, embracing over a thousand species; the skins of the birds of the same expedition; and the shells, radiates, &c.; many thousand series of fossils, vegetable and animal, both vertebrate and invertebrate; all the insects,

worms, microscopical preparations, &c.; a large portion of the ethnological collections, the entire herbarium, &c., amounting, in all probability, to 100,000 numbers.

The series of skins and eggs of North American birds has been entirely rearranged during the year to accommodate the large increase both of the species and the specimens. This has only been done approximately in regard to the mammals, as the additions have been so great, since their first arrangement in 1857, as to require a study of the entire class in order properly to determine their names.

The corals have all been arranged and fully labelled by Professor J. D. Dana during the year, and now constitute a highly interesting and important feature of the public collection.

During the year the services of Mr. P. P. Carpenter, the well known conchologist, having been secured, he is now at work upon the arrangement and labelling the shells, the whole labor of which will probably be completed in 1860. The co-operation of all the American conchologists, known as original investigators, has also been obtained, and the objects of their especial attention submitted to them for determination; the *Unionidæ* to Mr. Lea, assisted by Dr. E. Foreman; the *Helicidæ* to Mr. Binney; the east-coast shells to Mr. Stimpson; the west-coast to Mr. Carpenter himself; while Dr. Gould has identified the new species of the exploring expedition, and rendered aid in the criticism of the collection generally. Much assistance has also been rendered by Mr. J. G. Anthony, Mr. James Lewis, Dr. Newcomb, Mr. Lapham, and other gentlemen, who have made conchology a speciality.

In the proposed method of arrangement of the shells, the types of descriptions, and a good representative of each species in different ages and varieties, will be cemented to square plates of glass; the series, illustrating geographical distribution, being kept in trays.

A specimen of each species of North American shell will be exhibited on the glass plates in table cases, lined on the bottom with black paper; but of exotic shells there will only be table surface enough for a type of each genus. The other portions of the series will be kept in drawers below the tables. It is also proposed, for the more ready appreciation of points connected with geographical distribution, to keep in separate series the shells of northern China, Japan, and the North Pacific; the boreal shells of the west coast as far south as San Diego; the marine shells from San Diego to Panama; the marine shells of the west coast of South America; the marine shells of the Atlantic coast to Fernandina, Florida; the marine shells of Florida, the West Indies, and the Gulf of Mexico; and the different American land and fresh water species. The shells of the rest of the world, with a few exceptions, will probably be arranged in one systematic series.

As stated in the last report, a large portion of the collections in charge of the Smithsonian Institution are in the hands of various eminent naturalists for determination. Professor Agassiz and Mr. J. C. Brevoort have different portions of the series of fishes; Mr. Barnard, certain Echini; Professor Agassiz, the turtles; Mr. Cassin the South American birds; Mr. Lyman, the *Ophiuridæ;* Mr. Putnam, the

Etheostomoids; Drs. Torrey and Gray, the exploring expedition plants, &c. None of the collections, stated last year to be out of the building, have yet been returned.

Much progress has been made upon the descriptive works on North American *Diptera*, by Dr. Loew and Baron Osten Sacken; on *Neuroptera*, by Dr. Hagen; on *Hymenoptera*, by Mr. De Saussure; on *Coleoptera*, by Dr. Leconte; on *Hemiptera*, by Mr. Uhler; and on *Lepidoptera*, by Dr. Morris, based, to a greater or less extent, on specimens supplied by the Smithsonian Institution. It is hoped that nearly all these works will be submitted to the Institution during 1860; and their publication cannot fail to give an impetus to the study of entomology, so important in its application to the interests of agriculture. In this connexion it may be proper to state that a circular has been drawn up by Mr. Uhler, and published by the Institution, embodying numerous queries, having for their object the eliciting such information respecting the habits and history of the grasshopper tribes of North America as may serve as a basis of operations in restraining their ravages.

A circular intended to secure contributions of shells from different localities in North America, and a new edition of the circular in reference to North American eggs, have also been prepared for distribution.

PRESENT CONDITION OF THE COLLECTIONS.

In the last report I presented a list of all the great collections constituting the bulk of the museum of the Smithsonian Institution, and the additions since then are enumerated in the following pages.*

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* For convenience of reference, it may be well to continue the enumeration here from page 55 of the report for 1858 :

50. Collections made in Kansas, Nebraska, and Utah, by Captain J. H. Simpson, U. S. A.
51. Collections made on the South Pass wagon-road route, under F. W. Lander, esq.
52. Collections made on the El Paso and Fort Yuma wagon-road route, by J. B. Leech, esq.
53. Collections made on the wagon-road route from Walla-Walla to Fort Benton, by Lieutenant John Mullan, U. S. A.
54. Collections made during an exploration of the Upper Missouri and Yellowstone, by Captain J. W. Raynolds, U. S. A.
55 Collections made during the exploration of the San Juan and Upper Colorado, by Captain J. N. Macomb, U. S. A.
56. Collection made in an exploration of Cape St. Lucas, Lower California, by John Xantus, esq.
57. Collections made at Fort Crook, by John Feilner, esq.
58. Collections made in the Arctic regions, by Robert Kennicott, esq.
59. Collections made in Illinois, by J. W. Tolman, esq.
60. Collections made in Central Florida, by Dr. J. B. Bean.
61. Collections made in Kansas, Nebraska, and Utah, by Dr. Suckley, U. S. A.
62. Collections made in the Bahamas, by Mr. William Cooper.
63. Collections made in the Bahamas, by Dr. H. Bryant.
64. Collections made in South Florida, by Dr. J. G. Cooper.
65. Collections made in the Tortugas, by Captain H. G. Wright, U. S. A.
66. Collections made in the Tortugas, by Captain D. P. Woodbury, U. S. A.
67. Collections made in the Tortugas, by Dr. Whitehurst.
68. Collections made in Louisiana, by the professors and students of St. Charles College
69. Collections made on the Isthmus of Panama, by James McLeannan, esq.
70. Collections made in the West Indies and in Newfoundland, by Theodore Gill.
71. Collections from the Saskatchawan, by Captain John Blakiston, R. A.
72. Collections made by Commodore Perry on the Japan expedition.

The more prominent results of additions to the museum during the current year are to be seen in the approach to completion of the series of North American mammals and birds by the reception of such rare species as *Lagomys princeps*, *Aploceros montanus*, &c. Specimens of the musk ox, barren ground bear, and reindeer, with other species, collected by Mr. B. R. Ross for the Institution, were detained at Pembina with Mr. Kennicott's collections, having reached that point too late in the season to come through to St. Paul.

Among the species of birds added in 1859 may be mentioned *Phaeton flavirostris*, *Puffinus obscurus*, *Xema sabini*, *Rosthramus sociabilis*, *Vireo altiloquus*, *Sula personata*, *Tetrao richardsonii*, *Lagopus leucurus*, and adult *Colymbus arcticus* and *Podiceps arcticus*, in summer dress, with the numerous novelties from Cape St. Lucas sent by Mr. Xantus.

The series of South American birds has been largely increased in number of species. Many very rare North American eggs have been added to the collection. The other specimens received, with the exception of Mr. Stimpson's Atlantic coast shells, have served to fill up slight gaps in species or localities, rather than to bring any to a condition of completeness.

LIST OF DONATIONS TO THE MUSEUM DURING 1859.

Abbott, William.—Skins of birds from Florida.

Adams, Alvin.—Bark of giant tree of California (*Sequoia gigantea.*)

Adams, Alvin, William R. Patterson, Dr. Nichols, Dr. Emmerson, Dr. Emmerton, Dr. Thorndyke, Dr. Shrady, Dr. Robinson, and Dr. Hells.—Stalactite from the "Gothic Chapel" of the Mammoth Cave.

Akhurst, J.—Skins of birds from Central America, eggs of European and American birds, bats in alcohol from the West Indies.

Amherst College.—Eggs of Massachusetts birds.

Anderson, Dr. W. W., United States army.—Skins of birds and mammals from Rocky mountains.

Andrews, Professor E. B.—Fishes and reptiles in alcohol, Ohio.

Arnold, Benjamin.—Indian relics from Rhode Island.

Ashmead, Samuel.—Set of marine algae of United States coast.

Ashton, T. B.—Box of birds' eggs from New York.

Audubon Naturalists Club of Chicago.—Mounted specimen of *Grus americana*, or whooping crane.

Ayres, Dr.—Birds' eggs of California.

Baird, S. F.—Skin of *Arctomys monax*, New York.

Baird, William M.—Eggs of birds of New Jersey.

Baker, E. B.—Alcoholic collections, skins of birds, and egg of *Pandion* ——? Charlotte Harbor, Florida.

Barnston, George.—Skins of fishes, birds' eggs, &c., specimens in alcohol, from Lake Superior.

Beadle, Delos W.—Fifteen bottles alcoholic collections, Canada.

Bean, Jr. J. B.—Eggs of birds; reptiles, fishes, &c., from Florida.

Bedford, Alexander.—Fossils, Michigan.

Bellman, C.—Reptiles, fishes, &c., from Mississippi.

Benners, Henry.—Specimens in alcohol from Tortugas.
Berthoud, Dr. E. L.—Fossils from Kansas and Isthmus of Panama.
Blake, W. P.—Minerals, and eggs of birds from Georgia.
Blanc, Rev. A.—Eggs of birds of Louisiana and other zoological collections.
Bloomfield, Captain R. N.—Box of "coca" leaves.
Bossard, P.—Box of shells from Ohio.
Boston Society of Natural History.—Series of plants collected in California, by E. Samuels.
Brackett, George E.—Skin of star-nosed mole.
Brandt, H.—Box of insects, reptiles, and mammals, Kansas.
Brewer, Dr. T. M.—Eggs of fifty-seven species of European birds.
Brewster, Miss L.—Nests, eggs of birds from Massachusetts.
Brown, Dr. George C.—Skins of *Pityophis melanoleucus*, New Jersey; eggs of birds.
Brugger, Samuel.—Nests and eggs of birds, and mammals, Centre county, Pennsylvania.
Bryant, Dr. H.—Fishes, skins of birds, and eggs from the Bahamas.
Caldwell, Dr. H. C., United States navy.—Birds and alcoholic collections from Nicaragua.
Campbell, A.—Nine boxes natural history collections from northwest boundary survey, near Puget's Sound, collected by Dr. Kennerly, and one collected by George Gibbs.
Canfield, Dr. C. A.—Collection of eggs of Californian birds.
Carleton, Major J. H., United States army.—Shells from the Colorado desert.
Carter, B. F.—Shells from Texas.
Catley, H.—Lepidopterous insects from Oregon.
Churchill, R. C.—Eggs and birds from Maryland.
Clark, J. H.—Coal from Rabbit-ear Creek, Texas.
Clark, William.—Centipede; Van Buren, Arkansas.
Clark, W. P.—Box of eggs and can of fishes from Ohio.
Cope, E. D.—Type specimens of *Desmognathus ochrophea*, Pennsylvania.
Copenhagen Zoological Museum.—Type specimens of marine invertebrates of North Seas and West Indies.
Cooper, W.—Fifty-nine species of shells of Bahamas, &c., collection of Bahama fishes; shells and echinoderms of the Atlantic coast of the United States.
Cooper, Dr. J. G.—Specimens of woods, reptiles in alcohol, and eggs of Pipiry flycatcher from Florida.
Corey, O. W.—Box of fossil crinoids from Indiana.
Craig, Dr., United States army.—Skin of black wolf of Washington Territory.
Curley, Professor.—*Gordius* or hair worm in alcohol.
Danker, Henry A.—Nests and skins of birds from New York.
Davis, William A.—Fossils; Illinois.
Darrell, Chief Justice.—Skins and eggs of Bermuda birds; reptiles in alcohol.
Dawson, Professor J. W.—Fossil *Pupa vetusta* from Nova Scotia.

Day, Mrs. Thomas W.—Collection of eggs from California.
Diggs, Captain.—Skin of otter, Washington Territory.
Dorsey, William.—Minerals from Chile.
Dow, Captain J. M.—Alcoholic specimens, Nicaragua; and silver ore from San Salvador; two living Curassows, Central America.
Drexler, C.—Mounted birds and fishes.
Dunbar, R. W.—Skeleton of sea otter; specimens of woods and Indian curiosities, coast of Oregon.
Dunham, Ed.—Mounted specimens of curlew and grayback snipe.
Duval, Alfred.—Seeds, silk cotton, minerals, &c.; Payta, Peru.
Eastman, S. C.—Eggs of birds from Labrador.
Edwards, W. A.—Eggs of frigate pelican, echini and crustacea, Central America.
Edwards, Amory.—Brazilian "coal."
Falls, A. J.—Fresh birds, Washington.
Fisher, Dr. G. J.—Eggs of hawks from New York.
Flint, C. L.—Nest of golden crowned thrush.
Force, Colonel P.—Hornets' nest; Washington.
Gantt, Dr. W. H.—Nests and eggs of birds from Texas.
Gardiner, Capt. J. W., United States army.—Skin and skeleton of Fisher (*Mustela pennantii;*) Indian nets, Fort Crook, California.
Gary, Jacob S.—Fossil wood, Ohio.
Gerhardt, A.—Skins and eggs of birds from Georgia, with alcoholic specimens.
Gibbs, George.—Seeds of Coniferae; Puget's Sound.
Gibbes, Professor L. R.—Box of fresh shrips.
Gill, Theo.—Birds, reptiles, fishes, &c., of Trinidad and Newfoundland.
Gilliss, Lieutenant J. M., United States navy.—Eye of *Loligo*, from a grave at Areca, Peru; *Etheostoma* from Washington.
Gilpin, Dr.—Mammals and reptiles in alcohol from Nova Scotia.
Glover, T.—Living sandhill crane (*Grus canadensis*) with zoological collections in alcohol, Florida.
Godfrey, Mrs. A. D.—Skin of snow goose from Puget's Sound.
Gordon, Dr. H. N.—Skin of young cinnamon bear (*Ursus Americanus,*) Illinois.
Goss, B. F.—Eggs of birds and skins of mammals from Kansas.
Grayson, A. J.—Two boxes of skins and eggs of birds, and bottle of reptiles from California.
Gunn, Donald.—Skins of birds and mammals from North Red River.
Hall, Dr. J.—Living *Anolis carolinensis*, Alabama.
Hampton, W. C.—Seeds of Australian plants.
Harvey, Prof. W. H.—Collection of Australian marine algae.
Hayden, Dr. F. V.—(See Captain Raynolds.)
Hayes, Dr. S.—Mezquite gum and alcoholic collections; dried plants Western Texas, New Mexico, and California; skins of birds; *Scalops latimanus* in alcohol, &c., Fort Belknap, Texas.
Hayes, Dr. S.—(See Colonel Leech.)
Hoy, Dr. P. R.—Skins of rare birds of Wisconsin.
Haymond, Dr. R.—Nests and eggs of birds of Indiana.

Hepburn, J.—Skins and eggs of California birds.
Hine, D.—Cannel coal, Ohio.
Hinman, W. M.—Package of plants from Laramie Peak.
Holden, W.—Thirty-six species of Univalve shells from Ohio.
Hoopes, B. A.—Reptiles and mammals in alcohol, Lake Superior.
Hopkins, Prof. Wm.—Birds' eggs, New York.
Hopkins, Arch.—Birds' eggs, Massachusetts.
Hubbard, Chas. A.—Skins and eggs of birds from the Red River of the North.
Hunter, Dr. C. L.—*Arvicola pinetorum* from North Carolina.
Interior Department.—(See Colonel Leech.)
Irwin, Dr., U. S. A.—Box of birds from New Mexico.
Jan, Dr. C.—Type series of exotic serpents from the Museo Civico, Milan.
Jardine, Sir W.—Skin of *Plectrophanes lapponica* from Arctic America.
Jenkins, J. H.—Shells of Washington Territory.
Johns, Dr., U. S. A.—Fragments of Mastodon remains from Scott's Bluffs.
Kellogg, F.—Tertiary shells from Texas.
Kennedy, J. M.—Four specimens of birds from New Mexico.
Kennerly, Dr.—Seeds of *Thuya gigantea*, Washington Territory. See also A. Campbell.
Kennicott, R.—Zoological collections made between Lake Superior and Lake Winnipeg.
King, Dr. W. S., U. S. A.—Skin of Spermophile and Mexican weasel from Texas.
Kohler, W.—Lead ores from Union mines, Austinville, Virginia.
Krider, John.—Eggs of fish hawk.
Kuhn, Dr. L. de B.—Skull of bears, shells, insects, &c., Washington Territory.
Latchford, Thomas.—Fossil bones from Laurel Factory.
Lawrence, Geo. N.—Skins of birds from the Atlantic coast.
Leech, Colonel.—Collections of plants made by Dr. Hayes on the El Paso wagon road expedition in Texas, New Mexico, and California.
Libhart, J. J.—Box of birds' eggs, Pennsylvania.
Loomis, Miss M.—Fossil seeds from Burlington, Vermont.
Luther, Dr. S. M.—Shells and birds' eggs of Ohio.
McCarthy, Charles S.—See Captain J. H. Simpson.
McCown, Captain J. P., U. S. A.—Box of Kansas birds.
McCurdy, Dr. Samuel.—Skins of harlequin duck, Washington Territory.
McCurdy, S. B.—Curiously marked wood.
McIlvaine, J. H.—Eggs of birds.
McKee, Dr. J. Cooper, U. S. A.—Skins of mammals and birds, Fort Defiance.
McLain, William M.—Birds and eggs from Maryland; fish hook used by the natives of the Sandwich Islands.
McLeannan, James.—Sixty species birds from Isthmus of Panama.
McWilliams, Dr.—Skins of blue grosbeak and yellow-billed cuckoo.
Mallet, Prof. J. W.—Fossils from Alabama.

Martin, T. S.—Skins of birds of California.
Merrill, Lieut., U. S. A.—Box fossils from Green Bay, Wisconsin.
Moore, Miss J.—Living hawk moth from near Washington.
Moore, Dr. George F.—Birds' nests and eggs from North Carolina.
Morris, Rev. Dr. John G.—Box European eggs.
Mullan, Lt. John, U. S. A.—Three boxes zoological and geological collections made by John Pearsall on the Upper Missouri.
Nichols, Dr. C. H.—Armadillo from Paraguay.
Nunn, R. J.—Can of crustacea from Georgia.
D' Oca, R. Montes.—Mammals; reptiles of Mexico.
Odell, B. F.—Living rattlesnake from Iowa.
Packard, A. S.—Reptiles and mammals in alcohol; eggs of birds from Maine.
Page, Captain, T. J., U. S. N.—Sixty species of birds from Paraguay.
Paine, Charles S.—Box of birds' eggs from Vermont.
Paine, H. M.—Eggs of birds from New York.
Poey, Prof. F.—*Lucifuga subterranea*, a new blind fish of Cuba.
Pearsall, John.—See Lieutenant Mullan.
Peña, Don F. de.—Box of "coca" leaves.
Peters, R.—Skin of Cotton rat, *(Sigmodon hispidum,)* Georgia.
Peters, T. M.—Ferns, *(Trichomanes,)* from Alabama.
Piers, Dr., Royal navy.—Skin of *Thalassidroma furcata* from Barclay sound, northwest coast.
Plummer, Captain J. B., U. S. A.—Skins of birds, reptiles and fossils from Texas.
Porter, Prof. T. C.—Bottle of fishes, *(Rhinichthys,)* Pennsylvania.
Postell, J. P.—Specimens of *Unio spinosus* from Georgia.
Prentiss, D. W.—Skin of *Sorex* from near Washington.
Putnam, F. W.—Nest and eggs of birds, Massachusetts.
Rae, Dr.—Skins of *Spermophilus parryi*, Repulse bay, latitude 56° 30′ N.
Raymond, C.—Birds and other animals, Peru.
Raynolds, Captain W. F., U. S. A.—Zoological collections made in the Upper Missouri region by Dr. F. V. Hayden.
Reid, Peter.—Eggs of Hawk.
Richard, J. H.—Mounted European birds.
Roanoke Library Association.—Fossil bone from the green sand of North Carolina.
Robinson, E. S.—Nests and eggs from Mississippi.
St. Louis Academy of Science.—Serpent in alcohol, *(Celuta vermis,)* supposed to have been found in a block of stone.
Samuels, E.—Mounted microscopical preparations.
Sclater, P. L.—Mexican and Central American birds.
Simpson, Captain J. H., U. S. A.—Zoological collections made in Utah by Charles S. McCarthy.
Simpson, Dr., U. S. A.—Mounted snow owl, Rhode Island.
Smith, A. C., M. D.—Can of fishes from Ohio.
Smith, J. W.—Boring and other shells from Puget's Sound.
Sowthwick, Dr.—Skins of *Sciurus abertii*, Fort Union, New Mexico.
Spence, Mrs. David.—Collection of eggs from California.

Steele, Judge.—File fish in alcohol from Florida.
Stimpson, William.—Type series of marine invertebrates of Atlantic coast.
Stockton, Natural History Society.—Nests and eggs of California birds.
Suckley, Dr. George.—Harpoon used by Indians in catching whales on northwest coast, with other Indian curiosities. Zoological specimens from Kansas.
Swift, Dr., U. S. A.—Skin and skull of bighorn and horns of elk from Rocky mountains.
Taylor, A. S.—Box of crustaceans and shells, with other zoological collections from California; skull of grizzly bear.
Tolman, J. W.—Two boxes birds' eggs from Illinois.
Trask, Dr.—Crustaceans of California.
Trembley, Dr. J. B.—Shells and eggs from Ohio.
Tuley, Colonel James.—Fresh skin of elk.
Tully, Bernard.—Stalactites from Weir's Cave.
Vagnier, Thomas.—Nests and eggs of birds from Indiana.
Van Bokkelen, Lieutenant J. J.—Skin of puffin, Washington Territory.
Vaughan, Colonel A. J.—Foetal beaver and fossil coral; skulls of mammals and skins of birds from Upper Missouri.
Vickary, N.—Nests and skins of birds from Massachusetts.
Vialleton, Rev. F. and Rev. A. Blanc.—Collections of shells, eggs, insects, and reptiles from Louisiana.
Vollum, Dr. E.—Box of zoological specimens in alcohol, skins of animals, and birds' eggs from the coast of Oregon.
Vortisch, Rev. L.—Aboriginal stone hammer of green stone, Germany.
Walsh, Benjamin D.—Skin of bat and nest of humming bird from Illinois.
Walton, Hon. E. P., M. C.—Spawn of conch from Buzzard bay, Massachusetts.
Warren, Lieutenant J. R., U. S. A.—Box of Indian curiosities, (deposited.)
Waugh, A. Townsend.—Box insects, Maryland.
Weeks, W.—Bottle of fishes from Connecticut river.
Welch, George.—Eggs of birds of Massachusetts.
White, Lieutenant J. W., and officers of the "Jeff. Davis."—Zoological collections, chiefly invertebrates, from Puget's Sound.
Whitehurst, Dr. D. W.—Eggs of birds and specimens in alcohol from Tortugas.
Williams, E. C.—Large plank cut from redwood tree, (*Sequoia sempervirens*,) Cape Mendocino, California.
Willis, J. R.—Nests and eggs of birds from Nova Scotia.
Wilson, Dr. L. N.—Skins of carrion crow, (*Cathartes atratus*;) white ibis, &c., and dried grasses from Georgia.
Wolcott, F. H.—Box of "vegetable eggs."
Wood, Dr. W.—Birds' eggs from Connecticut.
Woodbury, Captain D. P., U. S. A.—Fishes and marine invertebrates in alcohol; skins and eggs of birds, and dried corals from Tortugas.

Wright, Charles.—Minerals and fossil radiates from Cuba.
Würdemann, G.—Twelve skins of birds, Florida.
Xantus, John.—Twenty boxes of natural history collections from Fort Tejon, California.
Unknown.—Box of coal; Indian remains from Scioto river; larvae of *Telephorus?* from the surface of snow in Oneida county, New York; package auriferous earth from Pike's Peak.

LIST OF METEOROLOGICAL STATIONS AND OBSERVERS

FOR THE YEAR 1859.

BRITISH AMERICA.

Name of observer.	Station.	N. latitude.	W. longitude.	Height.	Instruments.*
		° ′	° ′	*Feet.*	
Baker, J. C	Stanbridge, Canada East, (P. O. Saxe's Mills, Vt.)	45 08	73 00	----	T.
Connelly, Henry	Rigolet, Labrador	----	----	----	B. T.
Craigie, Dr. W	Hamilton, Canada West	43 15	79 57	----	B. T.
Delany, Edward M. J	Colonial Building, St. John's, Newfoundland.	47 35	52 41	170	B.T.R.
Gunn, Donald	Red River Settlement, Hudson's Bay Territory.	50 06	97 00	853	T. R.
Hall, Dr. Archibald	Montreal, Canada East	45 30	73 36	57	A.
Hartt, Chas. Fred'k	Acadia College, Wolfville, Nova Scotia.	45 06	64 25	95	A.
Hensley, Rev. J. M	King's College, Windsor, Nova Scotia.	44 59	64 07	200	A.
Magnetic Observatory	Toronto, Canada West	43 39	79 21	108	A.
Mackenzie, J	Moose Factory, Hudson's Bay Territory.	51 15	80 45	----	B. T.
Ross, Bernard R	Fort Simpson, Hudson's Bay Territory.	61 51	121 25	----	T.
Royal Engineers	Halifax, Nova Scotia	44 39	63 37	8	A.
Smallwood, Dr. Charles	St. Martin, Isle Jesus, Can. E.	45 32	73 36	118	A.

ALABAMA.

Name of observer.	Station.	County.	N. latitude.	W. longitude	Height.	Instruments.
			° ′	° ′	*Feet.*	
Alison, H. L., M. D.	Carlowville	Dallas	32 10	87 15	400	T. R.
Cobbs, Rev. R. A.	Union Town	Perry	32 30	87 31	----	N.
Foster, William L	Montgomery	Montgomery	32 22	86 31	----	N.
Hurt, Ashley D	Moulton	Lawrence	34 32	87 25	643	A.
Jennings, Dr. S. K.	Selma	Dallas	32 25	86 51	200	T.P.R.
	Orville		32 24	87 06	----	T.P.R.
Nicholson, Rev. J. J	Mobile	Mobile	30 30	88 30	188	B. T.
Shepherd, Rev. J. Avery	Montgomery	Montgomery	----	----	----	T. R.
Smith, Rev. Stephen U	Livingston	Sumter	32 30	88 16	180	T. P.
Troy, Matthew, M. D	Cahaba	Dallas	32 19	87 16	----	T.
Tutwiler, Henry	Havana	Greene	32 50	87 46	500	T. R.
Waller, Robert B.	Greensboro'	Greene	32 40	87 34	350	A.

* A signifies Barometer, Thermometer, Psychrometer, and Rain Gage.
B " Barometer.
T " Thermometer.
R " Rain Gage.
N " No instrument.

ARKANSAS.

Name of observer.	Station.	County.	N. latitude.	W. longitude.	Height.	Instruments.
			° ′	° ′	*Feet.*	
Barlow, Dennis	Arkadelphia	Clark	34 08	93 00		N.
Blackwell, W. H.	Perryville	Perry	35 05	93 16		N.
Coulter, B. F.	Brownsville	Prairie	34 50	92 00		N.
Davies, James T.	Gainesville	Greene		90 00	500	N.
Featherston, Geo. W.	Waldron	Scott	34 53	94 00		N.
Finley, P. F.	Spring Hill	Hempstead	33 30	93 40		T.
Flippin, W. B.	Yellville	Marion	36 30	93 00	1,000	N.
Graham, Paul	Bentonville	Benton	36 23	94 10	1,790	N.
Martin, G. Alex., M. D.	Jacksonport	Jackson	35 56	91 16		T.
Reynolds, J.	Spring Hill	Hempstead	33 30	93 40		T.
Smith, Dr. N. D.	Washington	Hempstead	33 44	93 41		T. R.
Weast, J. W.	Yellville	Marion	36 30	93 00	1,000	N.
Younger, Armistead	Buck Horn	Independence	34 30	92 00	650	N.

CALIFORNIA.

Name of observer.	Station.	County.	N. latitude.	W. longitude.	Height.	Instruments.
*Ayres, W. O., M. D.	San Francisco	San Francisco	37 48	122 27	130	A.
*Belcher, W. C.	Marysville	Yuba	39 29	121 30	80	T.
Boucher, Wesley K.	Mokelumne Hill.	Calaveras	38 18	120 28	1,502	N.
Canfield, Colbert A., M.D.	Monterey	Monterey	36 36	121 54	40	T.
Frombes, Prof. Oliver S.	Santa Clara	Santa Clara	37 18	122 00	100	A.
Gordon, Robert	Auburn	Placer	38 54	121 12	1,176	T.
Gould, Lewis A.	Santa Clara	Santa Clara	37 20	122 00	98	N.
*Logan, Thos. M., M. D.	Sacramento	Sacramento	38 35	121 28	41	A.
Randall, Robert B.	Crescent City	Del Norte	41 45	124 11	12	N.
Slaven, James	Honcut	Yuba	39 25	121 30		T. R.

DISTRICT OF COLUMBIA.

Name of observer.	Station.	County.	N. latitude.	W. longitude.	Height.	Instruments.
Smithsonian Institution	Washington	Washington	38 53	77 01	60	A.

CONNECTICUT.

Name of observer.	Station.	County.	N. latitude.	W. longitude.	Height.	Instruments.
Harrison, Benj. F.	Wallingford	New Haven	41 27	72 50	133	A.
Hunt, Rev. Daniel	Pomfret	Windham	41 52	72 23	587	A.
Johnston, Prof. John	Middletown	Middlesex	41 32	72 39	175	A.
Rankin, James	Saybrook	Middlesex	41 18	72 20	10	T. R.
Yeomans, William H.	Columbia	Tolland	41 40	72 42		T.

DACOTAH.

Name of observer.	Station.	County.	N. latitude.	W. longitude.	Height.	Instruments.
Norvell, Freeman	Greenwood		42 52	98 24	1,900	T. R.

* The names of these observers were accidentally omitted in the list for 1858.

DELAWARE.

Name of observer.	Station.	County.	N. latitude.	W. longitude.	Height.	Instruments.
			° ′	° ′		
Mauld, Dr. D. W.	Georgetown	Sussex				R.

FLORIDA.

Abert, Thayer	Warrington	Escambia	30 21	87 16	9	A.
Bailey, James B	Gainesville	Alachua	29 35	82 26	184	T. R.
Baldwin, A. S., M. D.	Jacksonville	Duval	30 15	82 00	14	A.
Bean, Dr. James B	Micanopy	Alachua	29 35	82 31	78	A.
Dennis, Wm. C.	Key West	Monroe	24 33	81 28	16	B. T. R.
Gibbon, Lardner	Tallahassee	Leon	30 29	84 07		T.
Ives, Edward R.	Lake City	Columbia	30 12	82 37	174	T. R.
Mauran, P. B, M. D.	St. Augustine	St. John's	29 48	81 35	8	B. T. R.
Steele, Judge Aug.	Atsena Otie	Levy	29 08	83 04	17	B. T. R.
Whitner, Benj. F	Tallahassee	Leon	30 24	84 17	70	T.

GEORGIA.

Anderson, Jas., M. D	Thomaston	Upson	32 56	84 30	750	A.
Arnold, Mrs. J. T.	Zebulon.	Pike	33 07	84 26		T.
Camp, Benj. F.	Covington	Newton	33 40	84 00	763	N.
Doughty, Dr. Wm. H.	Augusta	Richmond	33 27	81 33	152	A.
Easter, Prof. John D.	Athens	Clarke	33 58	83 35	850	A.
Gibson, R. T	Savannah	Chatham	32 02	81 01	18	T. R.
Grant, W. T., M. D.	Thomson	Columbia	33 26	82 28		B. T. R.
Pendleton, E. M., M. D.	Sparta	Hancock	33 17	83 09	550	T. R.
Posey, John F., M. D.	Savannah	Chatham	32 05	81 07	42	A.
Stanford, Col. John R.	Clarksville	Habersham	34 40			N.
Van Buren, Jarvis	Clarksville	Habersham	34 35	83 31	1,632	T. P.
Westmoreland, J.G., M.D.	Atlanta	Fulton	33 45	84 31	1,050	B. T. R.

ILLINOIS.

Aldrich, Verry	Tiskilwa	Bureau	41 15	89 66	550	N.
Allison, Jesse	Bloomington	McLean	40 30	89 00		N.
Babcock, Andrew J.	Aurora	Kane	41 41	88 17	650	T. R.
Babcock, E.	Riley	McHenry	42 11	88 20	760	T. R.
Bacon, E. E	Willow Creek.	Lee	41 45	88 56	1,040	T.
Ballou, N. E., M. D.	Sandwich	De Kalb	41 31	88 30	575	T. R.
Bassett, George R	Woodstock	McHenry	42 18	88 30		T. R.
Bowman, Dr. E. H.	Edgington	Rock Island	41 25	90 46	686	T. R.
Brendel, Fred'k, M. D.	Peoria	Peoria	40 43	89 30	460	T. P. R.
Brookes, Samuel	Chicago	Cook	42 00	87 30		T.
Cantril, Joshua E	Waynesville	De Witt	40 16	89 07		T. R.
Capen, E.	Batavia	Kane	41 52	88 20	636	B T.
Cobleigh, N. E.	Lebanon	St. Clair	38 37	89 56		B. T. R.

ILLINOIS—Continued.

Name of observer.	Station.	County.	N. latitude.	W. longitude.	Height.	Instruments.
			° ′	° ′	*Feet.*	
Bell, Mrs. E. M. A. } Wallace, Sam'l Jacob. }	Carthage	Hancock				T. R.
Collier, Prof. Geo. H.	Wheaton.	Du Page	41 49	88 06	682	A.
Eldredge, Rev. William V.	Newton	Jasper				T. R.
Ellsworth, Lewis	Naperville	Du Page	41 46	88 11		N.
Ellsworth, Milton S.	Naperville	Du Page	41 46	88 11		T.
Grant, John	Manchester	Scott	39 33	90 34	683	A.
Haeuser, Emil	Galena	Jo. Daviess				N.
Harris, J. O., M. D.	Ottawa	La Salle	41 20	88 47	500	T. R.
James, John, M. D	Upper Alton	Madison	39 00	89 36		A.
Little, J. Thomas	Dixon	Lee	41 45	89 31		N.
Mead, S. B., M. D.	Augusta	Hancock	40 12	91 45	*203	T. P. R.
Mead, Dr. Thompson	Batavia	Kane	41 52	88 20	636	A.
Newcomb, John B.	Elgin	Kane	42 00	88 15	777	A.
Riblet, J. H	Pekin	Tazewell	40 36	89 45		T. R.
Rogers, O. P. & J. S.	Marengo	McHenry	42 14	88 38	842	B. T. R.
Smith, Chas. E	Evanston	Cook	42 10	87 30	†18	T.
Smith, Geo. O., M. D.	Ottawa	La Salle	40 57	87 55	551	T. R.
Swain, John, M. D.	West Urbana.	Champaign	40 09	88 17	727	A.
Thomas, Mrs. Wm. S	Carbon Cliff	Rock Island	41 32	90 29	688	N.
Titze, Henry A	West Salem	Edwards	38 30	88 00		T. R.
Tolman, James W.	Winnebago Depot.	Winnebago	42 17	89 11	800	T. R.

INDIANA.

Anderson, H. H.	Rockville	Parke	36 00	87 00		N.
Austin, W. W.	Richmond	Wayne	39 47	84 47	800	T.
Bartlett, Isaac	Logansport	Cass	40 45	86 13	600	R.
Bullock, J. T.	Shelbyville	Shelby	39 00	87 00		
Chappellsmith, John	New Harmony	Posey	38 08	87 50	320	A.
Haines, John	Richmond	Wayne	39 52	84 59		B. T.
Larabee, Wm. H.	Green Castle	Putnam	39 30	86 47		N.
Martin, Dr. Alex.	New Albany	Floyd	38 17	85 45		T.
Menifield, Geo. C.	Mishawaka	St. Joseph	41 37	86 02	685	T. R.
Moore, Joseph	Richmond	Wayne	39 47	84 47	800	A.
Smith, Hamilton, jr.	Cannelton	Perry	37 57	86 42	450	A.
Sutton, George, M. D.	Aurora	Dearborn				B. T. R.
Turner, A. P.	Patoka	Gibson				N.
Vagnier, Prof. Thos.	Notre Dame	St. Joseph	41 40	87 10		B. T. P.
Webb, Miss G.	South Bend	St. Joseph	41 45	86 20		N.

* Above low water mark at Quincy.
† Above Lake Michigan.

IOWA.

Name of observer.	Station.	County.	N. latitude.	W. longitude.	Height.	Instruments.
			° ′	° ′	*Feet.*	
Beal, Dexter	Grove Hill	Bremer	42 45	87 15		T.
Beeman, Carlisle D.	Rossville	Allamakee	43 10	91 20	1,400	T. R.
Corse, John M.	Burlington	Des Moines	40 53	91 10	*486	T. R.
Doyle, L. H.	Waterloo	Black Hawk	42 30	92 31		N.
Finley, H. S.	Davenport	Scott	41 30	90 38	555	N.
Fory, John C.	Bellevue	Jackson	42 15	92 25		T. R.
Goss, William K.	Border Plains	Webster	42 05	94 00		B. T. R.
Horr, Asa, M. D.	Dubuque	Dubuque	42 30	90 52	*666	A.
Hudson, A. T., M. D.	Lyons	Clinton	41 50	90 10	401	R.
McBeth, Miss Sue	Fairfield	Jefferson	41 01	91 57	940	N.
McConnel, Townsend	Pleasant Plain	Jefferson	41 07	94 54	950	T. R.
McCready, Daniel	Fort Madison	Lee	40 37	91 28		T. R.
McKenzie, John M.	Fayette	Fayette	42 51	91 51	1,000	T.
Odell, Rev. Benj. F.	Plum Spring	Delaware	42 40	91 21		T.
Parvin, Theodore S.	Muscatine	Muscatine	41 25	92 02	586	A.
Shaffer, J. M., M. D.	Fairfield	Jefferson	41 01	91 57	940	A.
Sheldon, Daniel	Forestville	Delaware	42 40	91 50		T.

KANSAS.

Berthoud, E. L.	Leavenworth	Leavenworth	39 19	94 50	809	R.
Brown, G. W.	Lawrence	Douglas	38 58	95 12	800	N T. P
Clarkson, Rev. David	Fort Riley	Riley	39 00	96 30	1,300	N.
Collier, D. C.	Denver City	Arapahos				T.
Drummond, Rev. J. H.	Celestville	Lykins	38 40	95 16		N.
Ellis, Dr. Wm. T.	Lecompton	Douglas	39 03	95 10	760	T.
Fish, Lucian	Burlingame	Shawnee				T. R.
Goodnow, Isaac T.	Manhattan	Riley	39 13	96 45	1,000	T. R.
Goss, B. F.	Neosho Falls	Woodson	38 03	95 31		T. R.
McCarty, H. D.	Leavenworth	Leavenworth	39 20	94 33	1,342	A.
Millar, John H.	Wyandot	Wyandot	39 08	94 31	707	T. R.
Preston, Rev. N. O.	Manhattan	Riley	39 13	96 45		N.
Wattles, John O. Wattles, Celestia.	Moneka	Linn	38 30	98 00		T. R.

KENTUCKY.

Beatty, O.	Danville	Boyle	37 40	84 30	950	B. T. R.
Lunemann, John H. Miles, Thos. H., S. J.	Bardstown	Nelson	37 52	85 18		A.
Mattison, Andrew	Paducah	Mt. Cracken	37 00	87 21		N.
Ray, L. G., M. D.	Paris	Bourbon	38 16	84 07	800	B. T. R.
Savage, Rev. G. S., M. D.	Millersburg	Bourbon	38 40	84 27	804	B. T. R.
Walker, Mrs. Mary A.						
Barbage, Joshua C.	Hardinsburg	Breckenridge	37 40	86 15	500	N.
Williams, Rev. S. R.	Louisville	Jefferson	38 03	85 30	452	A.
	Lexington	Fayette	38 06	84 18		
Young, Mrs. Lawrence	Louisville	Jefferson	38 07	85 24	570	A.

* Above low water in the Mississippi.

LOUISIANA.

Name of observer.	Station.	County.	N. latitude.	W. longitude.	Height.	Instruments.
			° ′	° ′	*Feet.*	
Jackson, A. W., M. D.	Falls River	Point Coupee	30 20	91 31	----------	N.
Kilpatrick, A. R., M. D.	Trinity	Concordia	31 30	91 46	108	T. R.
Swasey, Col. C. B.	Independence	Livingston	30 30	90 33	50	N.
Taylor, Lewes B.	New Orleans	Orleans	29 58	90 07	----------	A.

MAINE.

Name of observer.	Station.	County.	N. latitude.	W. longitude.	Height.	Instruments.
Adams, John W.	Portland	Cumberland	43 39	70 00	180	N.
Bickford, Calvin	Warren	Lincoln	44 00	70 29	----------	N.
Brackett, G. Emerson	Belfast	Waldo	44 23	69 08	----------	T. R.
Brown, E. E., and others.	Hartland	Somerset	45 00	69 30	200	N.
Buller, E. A.	Freedom	Waldo	44 30	70 30	----------	N.
Dana, W. D.	North Perry	Washington	45 00	67 06	100	B. T. R.
Gardiner, R. H.	Gardiner	Kennebec	44 40	69 46	90	A.
Guptill, G. W.	Cornishville	York	43 40	70 44	800	T. R.
Johnson, Warren	Topsham	Sagadahoc	44 00	70 00	100	T.
Lord, W. G.	Limington	York	43 40	70 45	500	N.
Moore, Asa P.	Lisbon	Androscoggin	44 00	70 04	130	T. R.
Nichols, Charles L.	Newcastle	Lincoln	44 07	69 35	88	T.
	Bangor	Penobscot	44 48	68 47	----------	T.
Parker, J. D.	Steuben	Washington	44 44	67 50	50	A.
Van Blarcom, James	Vassalboro'	Kennebec	44 28	69 47	----------	T.
Verrill, G. W., jr.	Norway	Oxford	44 10	70 35	----------	N.
West, Silas	Cornish	York	43 40	70 44	784	T. R.
Wilbur, Benj. F.	Dexter	Penobscot	44 55	69 32	700	R.
Willis, Henry	Portland	Cumberland	43 39	70 15	87	A.
Wyman, A. H.	N'th Belgrade	Kennebec	44 30	70 00	----------	N.

MARYLAND.

Name of observer.	Station.	County.	N. latitude.	W. longitude.	Height.	Instruments.
Baer, Miss H. M.	Sykesville	Carroll.	39 23	76 57	700	T. R.
Bell, Jacob E.	Leitersburg	Washington	39 35	77 30	----------	T. R.
Goodman, Wm. R.	Annapolis	Anne Arundel	38 59	76 29	20	A.
Hanshew, Henry E.	Frederick	Frederick	39 24	77 26	----------	A.
Lowndes, Benj. O.	Bladensburg	Prince George.	38 57	76 58	70	T. R.
Mayer, Prof. Alfred M.	Baltimore	Baltimore	39 18	76 37	----------	A.
McWilliams, Dr. Alex'r.	Leonardtown	St. Mary's	38 17	76 43	----------	B. T.
Stephenson, Rev. Jas.	St. Inigoes	St. Mary's	38 10	76 41	45	A.
Sutton, Rev. A.	Chestertown	Kent	39 12	75 59	----------	A.

MASSACHUSETTS.

Name of observer.	Station.	County.	N. latitude.	W. longitude.	Height.	Instruments.
Adams, Edward L.	Boston	Suffolk	42 20	71 03	----------	B. T.
Alcott, William P.						
Berger, M. L.	Williamstown	Berkshire	42 43	73 13	725	B. T. R.
Morley, John H.						

MASSACHUSETTS—Continued.

Name of observer.	Station.	County.	N. latitude.	W. longitude.	Height.	Instruments.
			° ′	° ′	*Feet.*	
Bacon, William	Richmond	Berkshire	42 23	73 20	1,190	T. R.
Brewer, Francis A	Springfield	Hampden	42 06	72 36	----	N.
Collier, Alfred	South Groton.	Middlesex	42 30	----	300	T.
Davis, Rev. Emerson	Westfield	Hampden	42 06	72 48	180	A.
Fallon, John	Lawrence	Essex	42 42	71 11	133	A.
Felt, Charles W. Hanna, George B. Parsons, Benj'n W.	Bridgewater	Plymouth	42 00	71 00	150	A.
Harvard Coll. Observatory	Cambridge	Middlesex	42 23	71 07	80	A.
Mack, A. W	Danvers	Essex	42 35	71 03	----	B. T.
Metcalf, Jno. G., M. D.	Mendon.	Worcester	42 06	71 33	----	T. R.
Mitchell, Hon. Wm	Nantucket	Nantucket	41 17	70 06	30	A.
Rodman, Samuel	New Bedford.	Bristol	41 39	70 56	90	A.
Prentiss, Dr. Henry C.	Worcester	Worcester	42 16	71 48	537	A.
Snell, Prof. E. S.	Amherst.	Hampshire	42 22	72 34	267	A.
Tirrell, N. Q., M. D.	Weymouth.	Norfolk	42 10	71 00	150	B. T. R.
Whitcomb, L. F.	Florida	Berkshire	42 40	73 10	2,000	N.

MICHIGAN.

Abbe, Cleveland	Lansing	Ingham	42 44	80 00	850	N.
Allen, James, jr.	Port Huron.	St. Clair	42 58	82 24	606	T.
Blaker, Dr. G. H., jr.	Marquette.	Marquette	46 32	87 41	630	A.
Bowlsby, Geo. W	Monroe	Monroe	41 56	83 30	584	B. T. R.
Campbell, Wm. M., M. D.	Battle Creek	Calhoun	42 20	85 10	825	B. T. R.
Coffin, Matthew	Otsego	Allegan	42 28	85 42	662	N.
Crosby, J. B.	New Buffalo.	Berrien	41 45	86 46	661	B. T. R.
Holmes, J. C	Lansing	Ingham	42 44	84 15	750	B. T. R.
Pitcher, Dr. Zena Horton, L. S	Detroit	Wayne.	42 24	82 58	597	A.
Streng, L. H	Grand Rapids.	Kent	43 00	86 00	680	T. R.
Webb, Miss G.	Ypsilanti	Washtenaw	41 45	86 20	600	N.
Whelpley, Miss H. I.	Monroe.	Monroe	41 56	83 23	590	T. R.
Woodard, C. S.	Ypsilanti	Washtenaw.	42 15	83 47	751	A.

MINNESOTA.

Clark, Thomas	Beaver Bay.	Lake	47 12	91 19	657	A.
Garrison, O. E.	Princeton	Benton	45 50	93 45	----	T. R.
Hibbord, A. A.	Burlington	Lake	47 01	92 30	645	T. R.
Riggs, Rev. S. R.	Pajutazee	Brown	45 00	94 00	----	T. R.
Smith, A. C.	Forest City	Muker	45 45	96 00	----	T. R.
Thickstun, T. F.	Chatfield	Fillmore	----	----	*325	T. R.
Wieland, Henry	Beaver Bay.	Lake	47 11	91 25	850	T. P.

* Above La Crosse.

MISSISSIPPI.

Name of observer.	Station.	County.	N. latitude.	W. longitude.	Height.	Instruments.
			° ′	° ′	*Feet.*	
Cribbs, J. R.	Westville	Simpson	32 00	90 00		T.
Johnston, Wm. M., M. D.	Hernando	De Soto	34 45	90 15	*70	A.
Lull, James S.	Columbus	Lowndes	33 30	88 29	227	A.
McCary, Robert	Natchez	Adams	31 34	91 25	264	B. T. R.
Moore, Prof. Albert	Grenada	Yalobusha	33 45	90 00		N.
Robinson, Rev. E. S.	Paulding / Prairie Line	Jasper	32 20	89 20		A.

MISSOURI.

Bailey, S. S.	Dundee	Franklin	38 30	91 10	536	T.
Bowles, S. B., M. D.	Greenfield	Dade	37 22	93 41	1,800	N.
Byrns, Robert, M. D.	Kirksville	Adair				N.
Campbell, John	Carrollton	Carroll	39 30	93 31		N.
Christian, John	Harrisonville	Cass				N.
Conkling, Thos. J.	Trenton	Grundy	40 13	97 00		N.
Dalton, O. D.	Greenville	Wayne				N.
Dodson, B. D.	Toronto	Camden	37 54	92 30		N.
Englemann, George	St. Louis	St. Louis	38 37	90 16	481	A.
Fendler, Augustus.	St. Louis	St. Louis	38 37	90 16	470	P.
Finley, R. W.	Richmond	Ray	39 16	94 30		N.
Force, Nathan P.	Farmington	St. Francis	37 48	91 25		N.
Hamaker, Marion F.	Warrenton	Warren	38 45	91 11		T.
Hanan, B. P.	Luray	Clark	40 28	91 57		R.
Heaston, D. J.	Bethany	Harrison	40 15	94 00		N.
Horner, W. H.	Hornersville	Dunklin	36 03	90 00		N.
Huffaker, S. J.	Carrollton	Carroll	39 30	93 31		N.
Kiger, W. B.	Emerson	Marion	40 00	92 00		N.
Lingow, B. G.	Waynesville	Pulaski	37 45	92 13		N.
Lumpkin, Wm. M.	Tuscumbia	Miller	38 30	91 59	600	N.
Mallinckroot, Conrad	Augustus	St. Charles	38 30	90 46	780	T.
Maxey, W. F.	Paris	Monroe	39 30	92 00	700	T.
Myers, J. H.	Kirksville	Adair	40 38	92 50	1,000	N.
Sutherland, Norris	Boonville	Cooper	38 55	92 30		N.
Tidswell, Mary Alice	Warrenton	Warren	38 37	91 16	825	T.
Vankirk, W. J.	Bolivar	Polk	37 29	92 45		N.
Vogel, Chas	Rhineland	Montgomery	38 42	91 41	300	T. R.
Weatherford, John M.	Lancaster	Schuyler	40 30	92 45		N.
Weber, Philip	Hermann	Gasconade	38 40	91 27	598	N.
Wells, Wm.	Stockton	Cedar	39 36	93 48	800	T. R.
Wilson, Joseph A.	Lexington	Lafayette	39 15	93 45		N.
Wyrick, M. L.	Cassville	Barry	36 41	93 57	3,000	T. R.

* Above low water mark at Memphis.

NEBRASKA.

Name of observer.	Station.	County.	N. latitude.	N. longitude.	Height.	Instruments.
			° ′	° ′	*Feet.*	
Bowen, Anna M. J.	Elkhorn City	Douglas	41 22	96 12	1,000	T.
Byers, William N	Omaha	Douglas	41 15	96 10	1,300	T. R.
Evans, John	Fontanelle	Dodge	40 31	96 45	----	T.
Hamilton, Rev. Wm	Bellevue	Sarpy	41 08	95 50	----	T. R.
Mason, Edgar E.	Nebraska City	Otoe	40 40	95 44	1,050	T. R.
Miller, Ch. H.	S. Pass Wagon	Road Exped'n	42 28	108 40	*	B. T.
Rain, John G.	Omaha	Douglas	41 20	95 57	1,400	T. R.
Smith, Charles B.	Brownville	Nemaha	40 30	96 00	----	T.
Twiss, Major Thos. S.	Deer Creek	P. O. Fort Laramie.	42 50	105 50	5,000	T. R.
White, Bela	Kenosha	Cass	40 51	95 54	1,050	N.

NEW HAMPSHIRE.

Bell, Samuel N.	Manchester	Hillsborough	42 59	71 28	300	B. T. R.
Brown, Branch	Stratford	Coos	44 08	71 34	1,000	T. R.
Chase, Arthur	Claremont	Sullivan	43 22	72 21	535	B. T. R.
Hall, Joseph H.	Top of Mount Washingt'n	Coos	44 15	71 16	6,285	A.
Hoyt, Peter L., M. D.	Wentworth	Grafton	43 49	72 00	----	T. R.
Odell, Fletcher	Shelburne	Coos	44 23	71 06	700	B. T.
Smith, Rufus	N. Littleton	Grafton	44 20	72 13	----	N.
Wiggin, Andrew	Stratham	Rockingham	43 00	73 35	100	N.

NEW JERSEY.

Allen, Edwin	New Brunsw'k	Middlesex	40 30	75 31	90	N.
Parry, William	Cinnaminson	Burlington	40 00	75 01	83	N.
Thornton, Miss E. E.	Moorestown	Burlington	39 58	74 13	104	B. T. P.
Watson, George	Woodstown	Salem	39 39	75 20	30	T. R.
Whitehead, W. A.	Newark	Essex	40 45	74 10	35	B. T. R.
Willis, O. R.	Freehold	Monmouth	40 15	74 21	----	T.

NEW YORK.

Arden, Thomas B.	Garrison's	Putnam	41 23	74 02	180	T. R.
Aubier, John	Fordham	Westchester	40 54	73 57	147	A.
Bowman, John.	Baldwinsville	Onondaga	43 04	76 41	----	T.
Brown, Rev. John J.	Dansville	Livingston	42 38	77 44	672	A.
Dayton, E. A.	Madrid	St. Lawrence	44 43	75 33	280	B. T. P.
Denning, William H.	Fishkill Landing.	Dutchess	41 33	74 18	42	B. T. R.
Dewey, Prof. Chester, Ira C. Clark, T. T. Filmer	Rochester	Monroe	43 08	77 51	516	B. T. R.

* Six miles east of summit of South Pass.

NEW YORK—Continued.

Name of observer.	Station.	County.	N. latitude.	W. longitude.	Height.	Instruments.
			° ′	° ′	*Feet.*	
Elleston, Job	Geneva	Ontario	-------	-------	-------	T.
Frost, Col. E. C	Havana	Schuyler	42 30	76 31	1,041	T.
Grush, James W Alexander, James M	Spencertown	Columbia	42 18	73 32	700	A.
Guest, W. E	Ogdensburg	St. Lawrence	44 43	75 37	232	R.
Holmes, E. S	Wilson	Niagara	43 20	78 56	250	T.
House, John C	Waterford	Saratoga	42 47	73 39	70	A.
Howell, R	Nichols	Tioga	42 00	76 32	-------	T.
Ingersoll, J. D	Ilion	Herkimer	43 00	79 51	-------	N.
Ives, William	Buffalo	Erie	42 50	78 56	600	A.
Julien, Alexis A Schauber, H. A	Schenectady	Schenectady	42 49	73 55	300	T.
Kelsey, Kathalo	Great Valley	Cattaraugus	42 12	78 45	-------	N.
Landon, Anna S	Eden	Erie	42 30	79 11	700	T.
Mackie, Matthew	Clyde	Wayne	43 10	77 10	400	B. T.
Malcom, Wm. S	Oswego	Oswego	43 28	76 30	250	B. T. R.
Matthews, M. M., M. D	Rochester	Monroe	43 08	77 51	525	A.
Morris, Professor O. W	New York	New York	40 43	74 05	25	A.
Paine, H. M., M. D	Clinton	Oneida	43 03	75 18	500	T. P. R.
Potter, C. D., M. D	Adams Centre	Jefferson	43 48	75 52	632	R.
Riker, Walter H	Saratoga	Saratoga	43 06	74 00	306	A.
Sartwell, Dr. H. P	Penn Yan	Yates	42 62	77 11	740	A.
Sias, Professor Solomon	Fort Edward	Washington	43 13	73 42	-------	A.
Spooner, Dr. Stillman	Wampsville	Madison	43 04	75 50	500	T. R.
Sylvester, Dr. E. Ware	Lyons	Wayne	-------	-------	-------	B. T.
Titus, Henry Wm	Bellport	Suffolk	40 44	72 54	15	A.
Tompkins, William	Germantown	Columbia	-------	-------	175	N.
Van Kleek, Rev. R. D	Flatbush	Kings	40 37	74 01	54	B. T. R.
Wadsworth, A. S	East Henrietta	Monroe	43 06	77 51	600	B. T. P.
White, Aaron	Cazenovia	Madison	42 55	75 46	1,260	A.
Yale, Walter D	Houseville	Lewis	43 40	75 32	-------	T. R.
Young, Jude M	West Day	Saratoga	43 20	75 16	1,200	T.
Zaepffel, Joseph	West Morisania.	Westchester	40 53	74 01	190	T.
Zimmerman, Godfrey	Pine Hill	Erie	42 45	79 06	680	N.

NORTH CAROLINA.

Carter, Thomas Hamilton, W. H	Raleigh	Wake	35 40	78 52	317	N.
Kerr, Professor W. C	Davidson College.	Mecklenburg	35 30	80 54	850	B. T. R.
McDowell, Rev. A	Murfreesboro'	Hertford	36 30	77 01	-------	A.
Moore, Geo. F., M. D	Green Plains	Northampton	36 32	77 45	-------	T. R.
Phillips, Prof. James, D.D.	Chapel Hill	Orange	35 54	79 17	-------	B. T. R.
Westbrook, Samuel W	Greensboro'	Guilford	37 00	80 01	840	N.

OHIO.

Name of observer.	Station.	County.	N. latitude.	W. longitude.	Height.	Instruments.
			° ′	° ′	*Feet.*	
Abell, B. F.	Welshfield	Geauga	41 23	81 12	1,205	T. R.
Ammen, J	Ripley	Brown	38 37	83 31	———	B.T. R.
Anthony, Newton	Mount Union	Stark	40 54	81 31	———	T.
Atkins, Rev. L. S	Madison	Lake	41 49	80 10	———	T.
Benner, J. F.	New Lisbon	Columbiana	40 45	80 45	961	B.T. R.
Bennett, Sarah E.	Toledo	Lucas	41 49	83 34	———	T.
Bowen, Wm. F.	Sharonville	Hamilton	39 19	84 30	800	N.
Boyd, S. T.	Iberia	Morrow	40 46	82 52	1,160	T. R.
Chase,	Marion	Marion	40 30	83 21	———	N.
Clark, Wm. P.	Medina	Medina	41 07	81 47	1,255	A.
Colbrunn, Edward	Cleveland	Cuyahoga	41 30	81 40	665	T.
Cotton, D. B., M. D.	Portsmouth	Scioto	38 45	82 50	529	B.T. R.
Crane, Geo. W.	Bethel	Clermont	39 00	84 00	555	T. R.
Davidson, H. M.	Freedom	Portage	41 13	81 08	1,100	B.T. R.
Davis, W. E.	Lancaster	Fairfield	39 41	82 37	1,020	B.T. R.
Dille, Israel	Newark	Licking	40 07	82 21	825	T.
Gamble, J. W.	Russell's Sta'n	Highland	39 13	83 36	1,000	N.
Hammitt, John W	College Hill	Hamilton	39 19	84 25	800	N.
Hampton, W. C.	Mt. Victory	Hardin	40 35	83 36	1,500	N.
Harper, Geo. W.	Cincinnati	Hamilton	39 06	84 27	500	A.
Haywood, Prof John	Westerville	Franklin	40 04	83 00	———	A.
Hill, F. G.	Dallasburg	Warren	39 30	84 31	800	N.
Hillier, Spencer L.	Breckville	Cuyahoga	41 15	81 30	800	A.
Huntington, Geo. C.	Kelley's Isl'nd	Erie	41 36	82 42	587	B.T. R.
Hyde, Gustavus A.	Cleveland	Cuyahoga	41 30	81 40	643	B.T. R.
Ingram, John, M. D.	Savannah	Ashland	41 12	82 31	1,098	A.
Johnson, Enoch D.	———	Monroe	39 30	81 00	540	T. R.
King, Mrs. Ardelia C.	Madison	Lake	41 52	81 00	620	T. R.
Luther, S. M	Hiram	Portage	41 20	81 08	1,290	T. R.
Mathews, J. McD., D. D.	Hillsborough	Highland	39 13	83 30	1,134	A.
McClung, Charles L.	Troy	Miami	40 03	84 06	*404	B.T. R.
McMillan, S. B.	East Fairfield	Columbiana	40 47	80 44	1,152	A.
Peck, W. R., M.D.	Bowl'g Green	Wood	41 15	83 40	700	B.T. R.
Peters, Adam	Zanesville	Muskingum	———	———	———	T.
Phillips, R. C. and J. H.	Cincinnati	Hamilton	39 06	84 27	540	B.T. R.
Raffensperger, E. B.	Toledo	Lucas	40 30	83 20	———	N.
Rhoades, Dr. John	Hocking Port.	Athens	39 00	81 30	———	N.
Shaw, Joseph	Bellefontaine	Logan	40 21	83 20	1,040	T. R.
Shields, Rev. Robert, Smith, John C.	Bellecentre	Logan	40 30	83 45	1,170	B.T. R.
Treat, Samuel W.	Windham	Portage	41 10	81 05	939	T.
Tweedy, David H.	Mt. Pleasant	Jefferson	40 20	83 34	———	N.
Ward, Rev. L. F.	Avon	Lorain	41 27	82 04	800	A.
Warder, A. A.	Cincinnati	Hamilton	39 08	84 35	800	T. R.
Williams, Prof. M. G.	Urbana	Champaign	40 06	83 43	1,015	B.T. R.
Wilson, Prof. J. H.	College Hill	Hamilton	39 19	84 26	800	B.T. R.
Young, Prof. Chas. A., Childs, E. W.	Hudson	Summit	41 15	81 24	1,137	B.T. R.

OREGON.

Stebbins, George H.	Portland	Multnomah	45 24	121 30	170	T. R.

* Above Ohio river at Cincinnati.

PENNSYLVANIA.

Name of observer.	Station.	County.	N. latitude.	W. longitude.	Height.	Instruments.
			° ′	° ′	*Feet.*	
Alsop, Samuel	Westchester	Chester	39 57	75 34	550	A.
Baird, John H	Tarentum	Alleghany	40 38	79 46	950	T.
Barrett, James	Linden	Lycoming	41 14	77 11	514	A.
Boyers, W. R	Altoona	Blair	40 30	78 31	1,168	B.T.R.
Brewster, Wm., M. D	Huntingdon	Huntingdon	40 35	78 03	734	B.T.R.
Brugger, Samuel	Fleming	Centre	40 55	77 53	780	T. R.
Burrell, J. Ilgen	Bellefonte	Centre	40 50	77 49		T.
Coffin, Selden J Houghton, George S	Easton	Northampton	40 43	75 16	320	A.
Cook, Thos. E. & Sons	Bendersville	Adams				N.
Darlington, Fenelon	Parkersville	Chester	39 54	75 37	218	T. R.
Eggert, John	Berwick	Columbia	41 05	76 15	583	A.
Friel, P	Shamokin	Northumber'd	40 15	76 30	700	T. R.
Hance, Ebenezer	Morrisville	Bucks	40 12	74 48	30	B.T.R.
Harvey, J. C	Nazareth	Northampton	40 43	78 41	530	B.T.R.
Heckerman, Henry	Bedford	Bedford	40 01	78 30		T. R.
Heisely, Dr. John	Harrisburg	Dauphin	40 16	76 15		B.T.R.
Heyser, William, jr	Chambersburg	Franklin	39 58	77 45	618	A.
Hickok, W. O	Harrisburg	Dauphin	40 20	76 50	320	A.
Hoffer, Dr. Jacob R	Mount Joy	Lancaster	40 08	76 30		A.
Jacobs, Rev. M	Gettysburg	Adams	39 49	77 15	624	B.T.R.
James, Prof. Charles S	Lewisburg	Union	40 58	76 58		A.
Kirkpatrick, Prof. J. A	Philadelphia	Philadelphia	39 57	75 11	50	A.
Kohler, Edward	Whitehall st'n	Lehigh	40 40	75 26	250	T.
Meehan, Thomas	Germantown	Philadelphia				N.
Moore, Mahlon	Morrisville	Bucks				N.
Mowry, George	Somerset	Somerset	40 00	79 03	2,195	A.
Ralston, Rev. J. Grier	Norristown	Montgomery	40 08	75 19	153	A.
Scott, Samuel	Worthington	Armstrong	41 50	79 31	1,050	T. R.
Smedley, John H	Lima	Delaware	39 55	75 25	226	T.P.R.
Smith, Wm., D. D	Canonsburg	Washington	40 17	80 10	936	A.
Speer, Alex. M., M. D	Pittsburg	Alleghany	40 32	80 02	850	B.T.R.
Stewart, Thos. H	Murrysville	Westmorela'd	40 28	79 35	960	A.
Swift, Dr. Paul	W. Haverford	Delaware	40 00	75 21	400	T. R.
Tracy, James E	E. Smithfield	Bradford	41 58	76 37	1,000	N.
Travelli, John I	Sewickleyville	Alleghany	40 38	80 14		B.T.R.
Wilson, Prof. W. C	Carlisle	Cumberland	40 12	77 11	500	A.

RHODE ISLAND.

Caswell, Prof. A	Providence	Providence	41 49	71 25	120	A.

SOUTH CAROLINA.

Name of observer.	Station.	County.	N. latitude.	W. longitude.	Height.	Instruments.
			° ′	° ′	*Feet.*	
Barton, E. H., M. D	Columbia	Richland	33 57	81 07	233	A.
Cornish, Rev. John H.	Aiken	Barnwell	33 32	81 34	565	T. R.
Glennie, Rev. Alex'r.	Georgetown	All Saints	33 29	79 17	20	A.
Johnson, Joseph, M. D Dawson, J. L., M. D	Charleston	Charleston	32 46	80 00	20	B.T.R.
Ravenel, Thomas P	Black Oak	Charleston	33 00	80 00	50	A.
Superintendent Arsenal Academy.	Columbia	Richland	34 00	81 07	295	A.

TENNESSEE.

Barney, Chas. R.	University Pl.	Franklin	35 12	86 00	2,000	T. R.
Blake, J. R.	La Grange	Fayette				B.T.R.
Dodge, J. W. & Son	Pomona	Cumberland	36 00	85 00	2,200	T.
Houghton. S. W	Winchester	Franklin	35 10	86 11		T. R.
Stewart, Prof. Wm. M	Clarkesville.	Montgomery	36 28	87 13	481	A.
Tuck, W. J., M. D Mitchell, R. W., M. D	Memphis	Shelby	35 08	90 00	262	A.

TEXAS.

Allis, Melvin H	Gonzales	Gonzales	29 35	97 30		N.
Colman, William	Texana	Jackson	29 00	96 30	60	N.
Crockett, Jno. M	Dallas	Dallas	32 45	96 46		T.
Cunningham, J. D	Bastrop	Bastrop				N.
De Graffenried, W. G., M. D.	Columbus	Colorado	29 43	96 36	198	N.
DeJernett, R., M. D	Greenville	Hunt	33 10	97 23		N.
D'Spain, Dr. B. L Ewing, J. M	Tarrant	Hopkins	33 30	96 41		N.
Epperson, W. T	Jefferson	Cass	32 30	94 30	65	N.
Freese, G	Boston	Bowie	33 25	94 40	600	N.
Friedrich, Otto	New Braunfels.	Comal	29 41	98 15		B. T. R.
Gaffney, James O	San Patricio	San Patricio	27 45	98 31		R.
Gantt, Dr. Wm. H	Union	Washington	30 11	96 31	540	T. R.
Gardiner, Jas	Port La Vaca.	Calhoun	28 38	96 37	25	N.
Gibbs, T	Huntsville	Walker				R.
Glasco, J. M	Gilmer	Upshur	32 46	94 49	1,017	T.
Kapp, Ernst	Sisterdale	Blanco	29 54	98 35	1,000	A.
Kellog, F	Wheelock	Robertson	30 50	96 30	450	R.
Moke, Dr. James E	Woodboro'	Grayson	33 47	96 36		N.
Palm, Swante	Austin	Travis	30 15	97 47		A.
Rayal, Jas. T	Kaufman	Kaufman	32 30	96 00		N.
Rucker, B. H	Washington	Washington	30 26	96 15		B. T. R.
Schuman, Bruno	Roundtop	Fayette	30 06	96 37		T. R.
Sias, Prof. Solomon	Bonham	Fannin	33 40	96 13	435	A.

TEXAS—Continued.

Name of observer.	Station.	County.	N. latitude.	W. longitude.	Height.	Instrument.
			° ′	° ′	*Feet.*	
Turner, T. A	Springfield	Limestone	31 30	96 15	4,500	N.
Van Nostrand, J	Austin	Travis	30 20	97 46	650	T. P. R.
Wade, F. S	Cross Roads	Williamson	30 29	97 26	672	T. R.
West, Dr. N. P	Burkeville	Newton	31 00	93 31		T.
Yellowby, Prof. C. W	Webberville	Travis	30 10	97 31		B. T. R.
Yoakum, F. L	Larissa	Cherokee	31 45	95 20		T. P. R.

UTAH.

Phelps, W. W	Great Salt Lake City.	Salt Lake	40 45	111 26	4,250	A.

VERMONT.

Buckland, David	Brandon	Rutland	43 45	73 00		T. R.
Cutting, Hiram A	Lunenburg	Essex	44 28	71 41	1,124	A.
Fairbanks, Franklin	St. Johnsbury	Caledonia	44 25	72 00	540	B. T. R.
Jackman, Prof. A	Norwich	Windsor	43 42	72 21		B.
Paddock, James A	Craftsbury	Orleans	44 40	72 29	1,100	T. R.
Parker, Joseph	West Rupert	Bennington	43 15	73 11	750	T.
Petty, McK	Burlington	Chittenden	44 27	73 10	367	A.

VIRGINIA.

Abell, J. Ralls	Charlottesv'le	Albemarle	38 00	78 31	521	T. R.
Astrop, Col. R. F	Crichton's Store.	Brunswick	36 40	77 46	500	T. R.
Boyers, Wm. R	Buffalo	Putnam	38 30	81 57	480	B. T. R.
Dickinson, George C	Cobham Depot	Albemarle	38 05	78 21	450	T. R.
Ellis, D. H	Wardensville	Hardy	39 30	78 03	1,720	B. T. R.
Fraser, James	New England	Wood	39 20	81 00		N.
Hotchkiss, Jed	Stribling Springs.	Augusta	38 20	79 05	1,600	T.
Jones, Silas B	Fork Union	Fluvanna	37 40	78 21		N.
Kendall, James E	Kanawha C. H	Kanawha	38 20	81 30	720	T. R.
Lockwood, George P	Wheeling	Ohio	41 09	80 46		T. R.
Mackie, Rev. C. B	Anna	Fairfax	38 56	77 04	180	T. R.
Meriwether, Chas. I	Richmond	Henrico				T. R.
Marvin, John W	Winchester	Frederick	39 15	78 10		T. R.
Pickett, John	The Plains	Fauquier	38 50	77 51		T.
Purdie, John R., M. D	Smithfield	Isle of Wight	37 02	76 37	100	T. R.
Reynolds, W. C	Kanawha Salines.	Kanawha	38 30	81 30		T. P. R.
Robey, Chas. H	Fredericksb'g	Spottsylvania	38 30	77 30	600	N.
Ruffin, Julian C	Garysville	Prince George	37 21	77 34	100	B. T. R.

VIRGINIA—Continued.

Name of observer.	Station.	County.	N. latitude.	W. longitude.	Height.	Instruments.
			° ′	° ′	*Feet.*	
Sanders, B. D.	Wellsburg	Brook	-------	-------	-------	T. R.
Slaven, James	Meadow Dale.	Highland	38 23	79 36	1,800	T. R.
Spence, Edward E	Montross	Westmoreland	38 07	76 46	200	T. P. R.
Stalnaker, J. W., M. D	Lewisburg	Greenbrier	37 49	80 28	2,000	T. R.
Upshaw, George W	Lloyd	Essex	-------	-------	-------	T. R.
Van Doren, Abram	Falmouth	Stafford	38 15	77 34	350	T. R.
Webster, Prof. N. B	Portsmouth	Norfolk	36 50	76 19	12	B.T. R.

WISCONSIN.

Armstrong, S	Pardeeville	Columbia	43 44	89 16	-------	T.
Atwood, Isaac	Lake Mills	Jefferson	43 00	89 00	-------	N.
Bean, Professor S. A	Waukeska	Waukesha	42 50	88 11	833	B.T.P.
Clarke, Prof. Ambrose W.	Delafield	Waukesha	43 20	88 31	900	B. T.
Curtis, W. W	Rocky Run	Columbia	43 26	89 20	-------	T. R.
Doyle, L. H	Otsego	Columbia	43 30	-------	-------	N.
Ellis, Edwin, M. D	Whitlesey	La Pointe	46 33	91 00	658	T. R.
Gordon, W. A., M. D	Wausau	Marathon	45 00	89 30	-------	T. R.
Gridley, Rev. John	Kenosha	Kenosha	42 35	87 50	600	B.T. R.
Haeuser, Emil	Black River Falls	Jackson	44 17	90 30	-------	T.
Johnson, A. K	Platteville	Grant	45 00	90 00	-------	T. R.
Kellogg, George J	Janesville	Rock	42 43	89 90	780	T.
Lapham, Increase A	Milwaukie	Milwaukie	43 03	87 54	593	B.T. P.
Larkin, Prof. E. P	Milwaukie	Milwaukie	43 02	87 55	684	B.T.
Lüps, Jacob	Manitowoc	Manitowoc	44 07	87 45	* 80	B. T.
Mann, Wm	Superior	Douglass	46 46	92 03	680	T. R.
Mason, Prof. R. Z	Appleton	Outagamie	44 10	88 35	800	A.
Matthews, D	Burlington	Racine	42 39	-------	700	N.
Nourse, J. Harvey	Bayfield	La Pointe	47 00	91 00	-------	T. R.
Pashley, J. S., M. D	Mosinee	Marathon	44 44	89 35	-------	T.
Pickard, J. L., M. D	Platteville	Grant	42 45	90 00	-------	T. R.
Pomeroy, F. C	Milwaukie	Milwaukie	43 03	87 57	658	T.
Porter, Prof. Wm	Beloit	Rock	42 30	89 04	750	B.T.R.
Sterling, Prof. J. W	Madison	Dane	43 05	89 25	1,068	A.
Underwood, Col. D	Green Bay	Brown	44 30	88 00	584	T. R.
Winkler, C., M. D	Milwaukie	Milwaukie	43 03	87 57	600	B.T.R.

* Above Lake Michigan.

MEXICO.

Name of observer.	Station.	Latitude.	Longitude.	Height.	Instruments.
		° ′	° ′	*Feet.*	
Berendt, German, M. D.	Vera Cruz, Vera Cruz	19 12	96 09	26	A.
Hieto, J. A*	Cordova, Vera Cruz	18 54	----	2,820	B. T. R.
Laszlo, Charles	Minititlan, Tehuantepec	17 59	94 07	60	A.
	Chinamaca, Tehuantepec	18 02	94 15	100	A.
Sartorius, Charles*	Mirador, Vera Cruz	19 15	96 25	3,600	A.

CENTRAL AMERICA.

Canudas, Antonio	Guatemala, Guatemala	14 37	90 30	----	A.

WEST INDIES.

Hayne, J. B	Turk's Island	----	----	----	B. T.

BERMUDA.

Royal Engineers, (in the Royal Gazette.)	Centre Signal Station, St. George's.	----	----	----	A.

SOUTH AMERICA.

Dorsey, Edward B.	Chanarcillo, Chile	27 28S	70 28	3,860	B. T.
Hering, C. T.	Plantation Catharina Sophia, Colony of Surinam, Dutch Guiana.	5 48	56 47	----	A.

ASIA.

arclay, R. G., M. D.	Jerusalem, Palestine	31 47	35 13E	2,610	A.

*Sent observations also for 1858.

METEOROLOGICAL RECORDS RECEIVED FROM PERSONS NOT REGULAR OBSERVERS.

From ANDREW SCOTT.—Copy of journal kept at the public library, Nassau, N. P., Bahamas, lat. 25° 05′, long. 77° 21′, by A. M. SMITH, Librarian, January, 1858, to August, 1859, observations of barometer, thermometer, and wind.

From Dr. EDWARD P. VOLLUM, U. S. A.—Twenty-four slips ozone paper, kept at Fort Umpqua, Oregon, from June 12 to August 5, 1859.

From Captain A. W. WHIPPLE, U. S. A.—Observations of barometer, thermometer, psychrometer, rain, clouds, and winds, from May 16 to September 30, 1859, made at Lake George, Chippewa county, Michigan. The observations for May were taken by J. H. FOSTER; for July, August, and September by EDWARD PERRAULT.

From A. MATTISON, Paducah, Ky.—Observations made at Bogota, South America, on barometer, thermometer, and rain, by EZEQUIEL URICOECHEA, for June, 1857, and March, April, and May, 1859. Printed slips.

From Lieutenant JOHN MULLAN, U. S. A., in charge of the military wagon road expedition from Fort Walla-Walla to Fort Benton. Observations made on barometer and thermometer at Cantonment Jordan, in the valley of the St. Francis Borgia river, for December, 1859, by W. W. JOHNSON.

From B. F. SHUMARD, Austin, Texas.—Observations on barometer, thermometer, winds, and clouds, for the year 1859, made on the geological and agricultural survey of Texas, under his direction, by GEORGE G. SHUMARD, M. D.

From JOHN H. CLARK, commissioner, United States and Texas boundary survey.—Barometric record from January 15 to September 21, 1859; the record not continuous, but made from time to time at the various astronomical stations. Received through the Interior Department.

From S. T. ANGIER, of Columbia, Texas.—Desultory notes of weather made in Sussex county, Virginia, during the year 1820.

From Captain JOHN POPE, U. S. A.—Observations with full set of instruments on expedition in Texas and New Mexico, made by JAMES M. READE, from March, 1855, to December, 1857.

Stations from which Telegraphic Reports of the weather were received at the Smithsonian Institution in the year 1859.

New York, N. Y.	Wytheville, Va.	Charleston, S. C.
Philadelphia, Pa.	Grafton, Va.	Augusta, Ga.
Pittsburg, Pa.	Wheeling, Va.	Savannah, Ga.
Baltimore, Md.	Parkersburg, Va.	Macon, Ga.
Frederick, Md.	Marietta, Ohio.	Columbus, Ga.
Hagerstown, Md.	Chillicothe, Ohio.	Atlanta, Ga.
Cumberland, Md.	Cincinnati, Ohio.	Prairie Bluff, Ala.
Richmond, Va.	Bristol, Tenn.	Montgomery, Ala.
Petersburg, Va.	Knoxville, Tenn.	Lower Peach Tree, Ala.
Norfolk, Va.	Chatanooga, Tenn.	Mobile, Ala.
Staunton, Va.	Raleigh, N. C.	Gainesville, Miss.
Charlottesville, Va.	Wilmington, N. C.	Jackson, Miss.
Lynchburgh, Va.	Columbia, S. C.	New Orleans, La.

DEATHS OF OBSERVERS.

SAMUEL BROWN, Bedford, Pa., died in end of 1858 or beginning of 1859. He commenced observing before 1854. The last register received from him was for October, 1858.

JOHN LEFFERTS, observer at Farmer, Seneca county, N. Y., died on the 14th of January, 1859.

WILLIAM CRANCH BOND, an eminent American astronomer and director of the Cambridge observatory, died on the 29th of January, 1859, in the 69th year of his age.

Dr. J. W. TUCK, secretary of the Board of Health, Memphis, Tenn., died about the first of June, 1859. Observer since 1857.

Dr. E. H. BARTON, formerly of New Orleans, died at Charleston, S. C., in September, 1859.

Dr. JOHN JAMES, Upper Alton, Illinois, observer since 1854, died October 11, 1859.

Dr. JOHN F. POSEY, Savannah, Ga., died in January, 1860. Observer since previous to 1854.

REPORT OF THE SECRETARY.

To the Board of Regents:

GENTLEMEN: From the facts presented in the following report of the operations of the Institution, I trust it will be apparent to your honorable Board and the public that nothing has occurred since your last session to interfere with the plan of organization, or with the transactions authorized in accordance with it; on the contrary, I think it will be evident that the labors to increase and diffuse knowledge have been unremitting, and that the results of these labors have met the approval and drawn forth the commendation of intelligent men in every part of the civilized world.

It will also appear that due attention has been paid to the finances, and although the expectation of assistance from the Patent Office on account of meteorology has not been realized, yet the expenditures have been kept within the receipts.

The annual income of the original bequest has been received from the Treasury of the United States, and the interest on the extra fund invested in State stocks has been promptly paid. From the report of the executive committee, it will be seen that there were $15,034 11 in the hands of the treasurer at the beginning of the year 1860; and that, on the closing of the accounts for receipts and payments for the past year, there is a balance on hand of $16,521 95. There are, however, outstanding bills, on account of work already contracted for, amounting to about $4,000, principally for publications which belong to the year 1861.

From this statement, it is apparent that the Institution could wind up its affairs at the present time with all the original fund bequeathed by Smithson in the Treasury of the United States, with an investment of $140,000 in State stocks, a balance in cash in its treasury of upwards of $12,000, and an extensive building containing a valuable library and collection of apparatus; and, for the history of its opera-

tions, could refer to twelve volumes of transactions and to other publications which have been printed, and are now to be found in all the principal libraries of the world; to a system of international exchange which has been inaugurated and successfully prosecuted for the last ten years; to an accumulation of a large amount of material in regard to the meteorology and physical geography of the North American continent, and to perhaps the largest collection which has ever been made of the natural history of the same region; and therefore, as far as they are responsible, the administrators could render a satisfactory account of the important trust confided to their care. We hope, however, notwithstanding the threatening aspect of our political affairs, that the time will be far distant when this Institution will be obliged to finally close its accounts. We trust that there is honesty, intelligence, and liberality sufficient in this country, whatever may be its political condition, to sacredly guard the bequest which was intrusted with unhesitating faith to the people of the United States for the good of mankind.

The policy of the Institution, from the beginning, has not been merely to collect and hoard up materials for local purposes, but in every way to promote the cause of science generally, by a liberal but prudent expenditure of its income in advancing among men the various branches of knowledge to which its efforts have been directed. For example, a great amount of labor has been expended in collecting specimens of natural history; and it will be seen, by the remarks on the collections that active measures are now in progress for rendering the results widely available for the purposes of science and education, by a general distribution of the duplicates.

The several objects to which the expenditures and labors of the Institution have been devoted during the last year, are nearly the same as those mentioned in previous reports; and in describing them we shall follow the order heretofore adopted.

Publications.—The twelfth volume of the *Smithsonian Contribution to Knowledge* has been completed, and will be ready for distribution as soon as it comes from the hands of the binder. It consists of 537 quarto pages, and is illustrated by three plates and twelve wood cuts. The following is a list of its contents:

I. Astronomical observations in the Arctic seas, by Elisha Kent Kane, M. D.

II. On fluctuations of level in the North American lakes, by Charles Whittlesey.

III. Meteorological observations made at Providence, Rhode Island, for 28½ years, by Prof. Alexis Caswell.

IV. Meteorological observations made near Washington, Arkansas, for 20 years, by Dr. Nathan D. Smith.

V. Researches upon the venom of the rattlesnake, with an investigation of the anatomy and physiology of the organs concerned, by Dr. S. W. Mitchell.

1. The first of the papers mentioned above forms the third part of the series of memoirs on the results of the observations of Dr. Kane, during the second Grinnell expedition. An account of the first and second numbers of the series, relating to magnetism and meteorology, has been given in the two preceding reports. The third, or present paper, gives the discussions and results of the astronomical observations which were made, principally at Van Rensselaer harbor, the winter quarters of the expedition during 1853–54–55. These observations were under the especial care of Mr. August Sonntag. The principal instruments employed were two sextants by Gambey, divided to ten seconds, a theodolite, a transit instrument, and five mean time chronometers. The observatory consisted of four walls of granite blocks cemented together with moss and frozen water. The transit and theodolite were mounted on piers formed of an extemporaneous conglomerate of gravel and ice, well rammed down into iron-hooped casks, and afterwards consolidated by water. Thus constructed, they were found to be as firm as the rocks on which they rested.

The first observations for latitude were made with the theodolite, and later ones by means of a sextant and artificial horizon, on the moon and moon-culminating stars. The time was noted by a pocket chronometer. The instrument was properly adjusted in position, but in consequence of the high latitude and the extreme cold, this was a very difficult operation. The angle of elevation was, in many cases, observed by the reflection of the image of the object from a mercurial horizon; the bubble of the level having been rendered useless by the extreme reduction of temperature to which it was subjected.

Observations were also made on occultations and eclipses, namely: the occultation of Saturn, December 12, 1853; of the same planet, January 8, 1854, and February 4, 1854; of Mars, February 13, 1854; and on the solar eclipse of May 15, 1855. In the occultations of Saturn, the disappearance and reappearance of the more prominent points of the ring were accurately noted, and the results have been elaborately discussed by Mr. Schott. From all the observations, the

longitude finally adopted for the observatory of Van Rensselaer harbor was 70° 52′ 45″ west from Greenwich. It may be interesting to remark that the degree of longitude in this high latitude is a little less than twelve nautical miles, (11.88.)

Besides the astronomical observations at Van Rensselaer Harbor, a number were made on the coast of Greenland when the expedition was on its way to its winter quarters, and a series for determining latitudes by travelling parties at different points in the regions explored.

From the full discussion of the whole series of observations both for latitudes and longitudes a new map which accompanies the paper has been protracted. This map differs from that given in Dr. Kane's narrative in shifting the position of the shore line of Kennedy Channel to the southward about nineteen nautical miles. The highest point of the eastern shore line traced on the corrected map is in latitude 80° 56′, and that on the western side of the channel 82° 7′. These are the northern limits of the exploration of the Grinnell expedition.

The fourth and last series of discussions and results of observations made by Dr. Kane during the second expedition has also been printed, and will form a part of the thirteenth volume of the Smithsonian Contributions. It relates to the tides in the Arctic seas. Occasional observations on the height of water were taken after passing Smith's straits, but the principal number recorded were made at Van Rensselaer Harbor. The series at this place commenced in September, 1853, and was continued to January, 1855. The observations during this period are very unequal in value, owing mainly to physical difficulties. The observations, by means of a sounding line or staff, were subject to irregularities from a slow movement of the vessel, which, though imbedded in the ice a greater part of the year, was not entirely stationary. The observations, by means of a string passing over a pulley and attached to a float, were also subject to certain irregularities due to an occasional slipping of the rope over the pulley, and another small variation caused by the gradual rising of the deck of the vessel above the level of the water, in consequence of her becoming lighter by the daily consumption of provisions and fuel.

In discussing these observations it was necessary in the first place to reduce the measurements to the same zero or level of the sea. To effect this, two curve lines were traced on paper, the upper one including the maximum rise of water for each day, and the other the lowest water for the same time. An intermediate line traced equidistant from these curves was then assumed to represent the mean elevation, and this straightened out was adopted as the axis of the mean level of the sea.

The corrections for referring each observation to the standard level were taken from this diagram—no allowance being considered necessary for a change in the variation of the mean level of the sea. All the observations properly corrected are given in a series of tables. From these tables, another series was deduced, exhibiting in one view the apparent time of high and low water, and the corresponding passages of the moon over the meridian, its declination and comparative distance from the earth. These latter tables were again plotted, and from the curves thus produced it appears that the average time of the occurrence of a series of 480 high waters at Van Rensselaer harbor was eleven hours and forty-three minutes after the passage of the moon across the meridian, corresponding to a mean declination of the sun and moon of sixteen degrees.

In like manner from 485 observations, the average time of low water occurred seventeen hours and forty-eight minutes after the passage of the moon over the meridian. The average interval of time between the high and low water was six hours and five minutes.

The tide wave at Van Rensselaer Harbor may be considered as transmitted from the Atlantic ocean, and only in part modified by the small tide originated in the waters of Baffin's Bay. This latter tide must necessarily be small, since the direction of the long and comparatively narrow bay is at right angles to that which would be most favorable to the production of a disturbance of this kind. That the ocean tide wave actually travels up along the coast of Greenland, or, in other words, that it reaches Van Rensselaer Harbor from the south, is proved by comparing the time of high water at different places along the west coast of Greenland.

Having the velocity of the tide wave along Baffin's Bay and Smith's Straits, the depth of the water may be approximately obtained. Assuming the distance along the channel, between Holsteinborg and Van Rensselaer Harbor, to be 770 nautical miles, the tidal wave has a velocity of 202 feet in a second, which, according to Airy's table, would correspond to a depth of about 1,300 feet. In the same manner, by comparing the co-tidal hours at Upernavik with those of Van Rensselaer Harbor, a resultant depth of nearly 4,800 feet is obtained. These two may be considered as the limits of the depths in Baffin's Bay and Smith's Straits.

Besides the points noticed, several others are fully discussed in this paper. Among these is what is called the diurnal inequality, or the difference between the height of the two tides at the same phases of the moon, depending principally on her position with reference to the

equator, as well as on her passage across the superior and inferior meridian of the place. The moon produces high water at the same instant of time on opposite sides of the earth, and were she constantly to move in the plane of the equator, the highest points of these tides would also be in the plane of the equator, and would consequently produce a series of equal tides at any place either north or south of this line. But it is evident that, when she ascends to the north, the plane of the highest tide will tip in the same direction, giving the highest point of one tide in the northern and the highest point of the other tide in the southern hemisphere. Consequently, when the moon has a northern declination, the tide at any place in the northern hemisphere which follows immediately after her passage across the meridian will be higher than one which passes twelve hours later. This variation in the height of the two tides is called the diurnal inequality. From theoretical considerations it would not be anticipated that this inequality should be well marked in such high northern regions; but since the movement of the water at Van Rensselaer's Harbor is not due directly to the action of the sun and moon, but is the effect of an immense wave propagated from the Atlantic through Baffin's Bay and Smith's Straits, this inequality becomes well marked.

About the time of the moon's maximum declination, the difference between the day and night tide was two and a half feet. By an examination of the diagrams on which the elevations of the tides are exhibited, it is seen that sometimes the day and sometimes the night tides are the highest; and, furthermore, that the difference vanishes a day or two after the moon crosses the equator, and that it reaches its maximum a few days after the moon attains its greatest declination north or south.

The form of the tide wave is also investigated and expressed in a diagram, from which it appears that the spring tide wave is slightly steeper between low and high water than between high and low water, or, in other words, that the water rises more rapidly than it falls, and also that the neap-tide wave is nearly symmetrical, the rise and fall taking place in nearly equal times.

The tabulated observations were also investigated in reference to the varying position of the sun and moon, giving rise to what is called the half monthly inequality, and the result of this is also plainly indicated by diagrams, for the high water as well as for the low. This paper, as we have stated, completes the results of the discussions of the series of observations made under the direction of Dr. Kane, and, by themselves, or in connection with other researches in the Arctic

regions, are valuable additions to our knowledge of the physical geography of the earth.

I regret to be obliged to state that since the publication of the paper on the winds at Van Rensselaer Harbor, some doubt has arisen as to the proper interpretation of the original record. It is stated by Dr. Kane that the observations of wind were uncorrected for magnetic variation. In consequence of this statement a correction was applied by Mr. A. Schott to reduce them to the true meridian. Mr. Sonntag, one of the principal observers, after his return from Mexico, asserted that the observations of the wind were recorded in reference to the true meridian, and therefore required no correction. The same statement was subsequently made independently by Dr. Hayes. An appendix has therefore been prepared for the series giving the corrections to be applied to the tables, in order that the results may be in conformity with either assumption. The weight of testimony would appear to be in favor of the supposition that the records of the wind at Van Rensselaer Harbor were recorded with reference to the true north; but the question cannot be fully settled until other observations from the same place are obtained.

The next paper in the 12th volume of Contributions is on the fluctuations of the level of the surface of the North American lakes. It has long been known that the great interior fresh water seas of North America are subject to variations of level. From the observations given in this paper and others previously published, the fluctuations are of three kinds: First. A general rise and fall, extending through a period of many years, which may be called the secular variation of level. It evidently depends on peculiar changes in the meteorology of the country drained, and although it may probably have a regular period of return, this has not yet been determined. Second. An annual rise and fall, the period of which is completed in about twelve months, which is caused by the changes of the seasons, can be predicted with considerable certainty, and is properly called the annual variation. Third. An irregular movement, producing frequently a sudden elevation, from a few inches to several feet. This is of two kinds, one evidently due to the wind, and the other resulting from rapid undulations in calm water. Both classes may be styled transient fluctuations. To these a fourth may be added, according to a late publication by Colonel Graham, United States Army, which is a true lunar tide. The author of this paper professes to have condensed from all sources within his reach information respecting the fluctuations of the water since the settlement of the country.

The whole is arranged in tables giving the dates of observation and the authorities from which they have been obtained. Although these tables are doubtless very incomplete, they have been accepted for publication as contributions to the subject, to be corrected and enlarged by subsequent observations.

A series of observations accurately made with properly arranged tidal instruments, such as are employed on the coast survey, and continued for a number of years, would be of much interest to science, as well as of value to commerce in the construction of wharves and the selection of harbors. Such a series has been established under the direction of Captain Meade, United States Topographical Engineers, which, with the observations under the direction of Colonel Graham, at Chicago, will furnish, if continued, the data required. We think it not improbable that, if the series is sufficiently extended, a law of periodicity will be discovered in the recurrence of the long intervals of rise and decline, and that these will have some relation to a periodical variation of the seasons in a series of years.

The most remarkable phenomena in regard to the fluctuations of the lakes are those of the fitful oscillations in which sometimes a sudden rise occurs of several feet at a particular place in calm weather, and also a series of minor agitations. The simplest hypothesis for the explanation of these phenomena is, that they are produced by the passage of atmospheric waves, such as are caused by thunder-storms, and perhaps in some cases by water-spouts, across distant parts of the lake. It is well established by observation at the Smithsonian Institution, as well as at other places, that rapid oscillations of the barometer accompany the passage of thunder-storms across the meridian. The mercury suddenly descends, then rises a little, and again falls, and after this regains its former level as the storm passes off to the east. A thunder-storm, therefore, in crossing the lake, would cause an elevation of water directly under it, which, in subsiding, would give rise to undulations, and these arriving in succession from every point of the path of the storm would produce effects similar to those which have been noted.

Since the whole lunar tide of the ocean does not exceed five or six feet, the effect of the moon even on such large bodies of water as those of the upper lakes must be very small. Colonel Graham finds the difference between high and low water at spring tides, at Chicago, on Lake Michigan, to be about three inches and a half, and to occur at thirty minutes after the passage of the moon over the meridian. It is probable that the height of the tide on Lake Superior would be greater

than this, and might best be observed at the narrowing portion of the extreme western end of the lake.

The twelfth volume of Contributions will also contain the records of meteorological observations made at Providence, by Prof. Caswell, an account of which was given in the last report. This series of observations occupies 179 of the largest quarto pages which can be introduced into the volumes of the Smithsonian Contributions. They comprise a record of the barometer and thermometer made three times a day, the direction and force of the wind, and the face of the sky for the same period; also, the depth of rain, together with a column of general remarks on casual phenomena. The series is terminated by a number of general tables—the first giving the monthly and annual mean height of the barometer during the whole term of years; the second, the monthly and annual mean height of barometer at sunrise or 6 a. m., 1 or 2 p. m., and 10 p. m.; third, monthly and annual mean temperatures, deduced from the three observations daily; fourth, monthly and annual mean temperatures at sunrise or 6 a. m., 1 or 2 p. m., and 10 p. m.; fifth, monthly and annual maximum and minimum temperatures and range; sixth, the number of days in each month in which the prevailing winds came from each of the four quarters of the horizon; seventh, mean force of the wind at the different hours of observation, and for the month and year; eighth, mean cloudiness of the sky at the different hours of observation, and the mean for the month and the year; ninth, monthly and annual number of days in which the weather was clear, variable, or cloudy—on which rain or snow fell; the tenth, monthly and annual quantity of rain and snow in inches.

From the records themselves an account of the weather on any day for twenty-eight years past may be obtained. From the general tables we can determine the connection of the variations of the barometer with the changes of the weather, and deduce rules of practical importance as well as of scientific interest. From the tables of the records of the thermometer, we find that the mean temperature of Providence for the whole time is 48° 19′, and that during the twenty-eight years of observation the oscillation on either side of this, with the exception of four years, is within a single degree.

The coldest year was that of 1836; the warmest was 1848. The warmest January was that of 1843, and the coldest that of 1857, which was also the coldest single month of the whole period. On an average, the coldest month of the year is February; the warmest month is July; and the warmest month of any summer of the whole period was August,

1848; and the next warmest, July, 1838. The mean annual amount of rain is 40.38 inches, distributed with considerable regularity. The month in which the most rain falls, on an average, is August; and that in which the least falls is February.

Another paper in the twelfth volume of Contributions is a series of meteorological observations, similar to the preceding, made at Washington, Arkansas, by Dr. Nathan D. Smith.

The place at which these observations were made is on the summit of the dividing ridge between the waters of the Red river and those of the Washita, fifteen miles northeast of Fulton and twenty south of the Little Missouri. From this ridge there is no higher level for a long distance; but to the northwest there is a gradual ascent for about fifty miles, to the foot of the mountains.

The records are of observations of the temperature at sunrise throughout the year, and at 2 p. m. in the winter, and 3 p. m. in the summer; amount of rain, and remarks on the weather; with the daily mean temperature, and monthly mean, maximum, minimum, and range, from January 1, 1840, to December 31, 1859, a period of twenty years. Appended to these observations are tables giving the following summaries for each month and year and for the whole series of twenty years:

1. Extremes of temperature. The highest temperature at sunrise and at 2 or 3 p. m.; the mean temperature of the warmest day; the lowest temperature at sunrise and at 2 or 3 p. m.; and the mean temperature of the coldest day.

2. Variations of temperature. Range of temperature at sunrise and at 2 or 3 p. m., and of the daily mean temperature; the extreme range of temperature; the greatest rise and fall of temperature from sunrise of one day to sunrise of the next day; the greatest rise and fall from 2 or 3 p. m. of one day to 2 or 3 p. m. of the next day.

3. Mean temperatures. Means at sunrise and at 2 or 3 p. m.; of months, years, and seasons; and of each day, as deduced from the observations for the whole twenty years.

4. The amount of rain for each month and year, and monthly and annual means for the whole series.

These tables, as in the case of those for Providence, furnish a series of interesting facts. For example: the mean temperature of the whole period is 61.81°; the warmest month is July, the coldest January; the warmest year was 1854, the coldest year was 1843. The coldest New Year's day recorded was that of 1840, the mean temperature of which was 22°; the warmest 1846 and 1855, the mean temperature of each being 57°. From these tables it appears that the coldest day in the

year, as deduced from the average of twenty years, is the 18th of January, and the warmest the 15th of July.

The mean annual amount of rain is 54.70 inches; the month of the greatest rain is April; of the least rain, September.

The last paper in the twelfth volume of Contributions consists of an account of researches upon the venom of the rattlesnake, with the investigations of the anatomy and physiology of the organs concerned, by S. Weir Mitchell, M. D.

This paper gives an account of a series of investigations relative to a subject which, from an almost instinctive aversion to venomous snakes and the danger to which the student is exposed, has received comparatively little attention. With the exception of the essays of Barton and Brainard, the literature of this subject in this country has been confined to scattered notices and incomplete statements of cases found in the pages of numerous medical journals, and, indeed, if we except a few works of Europe and India, in no part of the world has modern science done much to further this inquiry.

The author first gives an account of his observations on the habits of the rattlesnake when in captivity. From ten to thirty-five snakes were kept together in the same box without exhibiting the slightest signs of hostility to one another. Even when snakes were suddenly dropped upon their fellows no attempt was made to annoy the new comers, while the intrusion of a pigeon or a rabbit immediately roused the reptiles when they were in vigorous health. The habits of this snake in confinement are singularly inactive. In warm weather, when least sluggish, they lie together in a knotted mass, occasionally changing their position, and then relapsing into a state of perfect rest. This sluggish condition is dangerously deceptive, since it gives no indication of the rapidity of their motion when aroused. This reptile seldom eats in captivity. The author has kept one alive for a year without food, and though he made every effort to tempt the snakes to eat, he has never seen them disposed to avail themselves of food when placed within their reach. Some of them were forcibly fed by placing milk and insects in their throats, yet when even this precaution was not taken, provided the snakes had water, they continued healthful, and secreted a large amount of venom.

The author's observations add nothing towards confirming the idea of the disputed power of fascination in the snake. Birds, guinea-pigs, mice, and dogs, put into the cage generally exhibited no terror after the alarm had subsided occasioned by having been dropped into the box. The small birds soon became singularly familiar with the snakes,

and were seldom molested even if caged with six or eight large ones. Mice also lived on terms of confiding intimacy, sitting on the heads of the snakes and running over their coils, apparently unconscious of danger. Larger animals were not so safe in this, especially if they moved rapidly. All the animals frequently manifested an evident curiosity which prompted them to approach the snake, but this was sometimes reproved by a blow, particularly when a dog indulged his inquisitiveness by approaching his nose too close in the act of smelling. In a state of rest no odor is observed from the snake; but when it is roughly disturbed and induced to throw itself into contortions, a thin stream of yellow or dark brown fluid is ejected, the odor of which is extremely disagreeable.

The author next describes, from his own dissections, the anatomy of the parts connected with the secretion and expulsion of the venom. He also gives a full and complete account of the part played by the various muscles in the act of inflicting a wound. When preparing to strike, the snake throws his body into a coil, and by a violent contraction of the muscles which lie on the convexity of the bends, a portion of the body is immediately straightened and the head thrown forward in a direct line to a distance not exceeding one half of its length. The hooked fangs are made to enter the flesh of the victim and retained there until the venom is injected by a series of muscular contractions minutely detailed in the description. From this it appears that the animal may sometimes fail to inflict injury when seeming to do so. A knowledge of these facts is essential to a proper study of antidotes for the bite of the rattlesnake.

The venom is yellow, acid, glutinous, and of a specific gravity of 104. It is devoid of taste, smell, and acridity; begins to coagulate at 140° Fah., and is soluble in water. It consists, first, of an albuminoid substance, which is coagulable by pure alcohol, but not by a heat of 212° Fah. This material is the poisonous element, and receives from the author the name of crotaline; second, of an albuminoid compound, coagulable both by heat and by alcohol, and not poisonous; third, a yellow coloring matter and an undetermined substance, both soluble in alcohol; fourth, a trace of fatty matter and of free acid; fifth, saline bodies, chlorine, and phosphates.

The venom gland presents some anatomical analogy to that in which the saliva of other animals is formed; but there is an entire want of physiological resemblance between the venom and the saliva. It was found that no temperature from zero to 212° Fah. destroyed the poisonous property of the venom, which also remained unaltered when it

was treated with acids and alkalies at moderate temperatures, or with alcohol, chlorine water, iodine, &c. It prevented the germination of seeds planted in it, but did not destroy the vitality of large plants inoculated with it, nor did it interfere with saccharine fermentation nor with the accompanying growth of sporules.

The effect of the venom on cold blooded animals was studied on frogs and on the rattlesnake itself. In both the symptoms were like those in warm blooded animals, but very much slower of development. In the latter the effects were examined on pigeons, reed-birds, rabbits, gninea-pigs, and dogs, in all of which careful examination of the post-mortem lesions were made. The influence of the venom on the tissues and fluids of the economy is given in detail, and the following are some of the conclusions arrived at:

In all animals which die within a very short period after being bitten, there is no other lesion than the wound, the blood and tissues both being normal in appearance. In animals whose lives are prolonged, the blood is diseased and the tissues more or less altered. The venom is not absorbed by the stomach or the skin, but when drawn into the lungs of a pigeon it is fatal. The bite is attended with no primary inflammation, and the local swelling is due to effusion of fluid or semi-fluid blood. The muscles wounded by the fang are affected with twitching at first, and afterwards undergo a peculiar softening, and become more liable to rapid putrefaction than other parts. The muscular irritability ceases earlier than in ordinary cases of death, while the rigidity occurs as usual. The intestinal motions and those of the cilia are unaltered. The heart becomes enfeebled shortly after the bite, from direct influence of the venom on this organ, and not from the loss of the respiratory functions. Notwithstanding the diminution of its power, the heart is usually in motion after the lungs cease to act, and its tissues remain for a long time locally irritable. The paralysis of the heart is therefore not so complete as it is under the influence of upas or corroval. In warm-blooded animals artificial respiration prolongs the contractile power of the heart, but does not sustain it as long as when the animal has died by woorara or decapitation. In the frog, the actions of the heart continue after respiration has ceased, and sometimes survive until the sensory nerves and the nerve centres are dead, the motor nerves alone remaining irritable. In warm-blooded animals, respiration ceases, owing to paralysis of the nerve centres. The sensory nerves, and the centres of nerve power in the medulla spinalis and medulla oblongata, lose their vitality before the motor nerves become affected.

In cold-blooded animals the muscular system retains its irritability for a considerable time after death, so that this cannot be due to its loss. The first effect of the venom being to depress the vital energy of the heart and nerve centres, a resort to stimulants is clearly indicated as the only rational mode, in our present state of knowledge, of early constitutional treatment. In chronic poisoning, death is due to the continued influence of venom on the heart and nerve centres, and to secondary alterations of the blood and tissues. In these cases the fibrin of the blood is more or less dissolved, and the corpuscles are rarely and slightly altered, and not at all in animals which die soon after being bitten. The venom produces changes analogous to those in cases of yellow fever and some other maladies.

These conclusions rest on a series of apparently well-devised and carefully-executed experiments. They are principally original results, and the whole paper must, therefore, be considered a valuable addition to our knowledge of this interesting subject.

Attached to the memoir is an appendix containing an enumeration of the genera and species of rattlesnakes, with synonomy and references by E. D. Cope; also, a full bibliography of the subject by the author, with critical and analytical notices of the works mentioned; and this, with the authorities given by Mr. Cope, furnishes a complete list of all writers either on the natural history, or on the anatomy, physiology, and toxicology of venomous serpents in general. The paper is illustrated with wood cuts, and the author acknowledges his indebtedness to this Institution for aid in procuring the serpents which were essential to his investigations.

Professor Bache has presented for publication the second of his series of discussions of the magnetic observations made at Girard College between the years 1840 and 1845. Part 1 of this series, which is described in the last report, related to the investigation of the eleven-year period, or that which is coincident with the recurrence of frequency of the spots on the sun, and to other variations of the needle connected with solar action. The present paper relates to the influence of the moon on the variation of the magnetic needle.

The existence of a sensible lunar effect on the magnetism of the earth has been established by the labors of Sabine and others; it is, however, of much importance to confirm and extend their results by the discussion of independent observations. In the previous paper the method was shown by which the several influences of the sun were eliminated from the observations, leaving residuals from which the lunar influence could be deduced, the method being that followed by

General Sabine in his reduction of the results of the British observations. The records, after having been corrected for the influence of the sun and other perturbations, were arranged in tables, corresponding to the several hours of the day, commencing with the upper transit of the moon over the meridian. To ascertain whether the different parts of these series would give harmonious results, the whole number tabulated, 21,644, was divided into three groups, the first comprising nineteen months, the second, twenty-one months, and the third, eighteen months. From these it was found that the results were nearly proportioned to the number of observations, which indicated that no constant error of much magnitude existed.

The three groups were next discussed by means of Bessel's formula, two terms of which were found sufficient to give a curve representing the observations; and as a constant term was not found necessary in the construction of this curve, it was inferred that the moon exerted no specific constant action on the needle, or, in other words, that the magnetism of the moon is not *per se*, but is of that kind called *inductive*, which is due to the action of some extraneous body.

The curves by which the results of the discussion are represented show two east and two west deflections in a lunar day, the maxima east and west occurring about the time of the upper and lower transit of the moon over the meridian, and the minima about at the intermediate sixth hour.

In comparison with the effects of other forces operating on the magnetic needle, that of the moon is exceedingly small, and could not have been detected previous to the introduction of the more refined instruments and methods of investigation which have been invented within the last twenty years. The total range at Philadelphia scarcely reaches thirty seconds, and at Toronto it is only a little more than thirty-eight seconds.

The principal western maximum deviation occurs six minutes after the moon passes the lower meridian, and amounts to 13.8 seconds of arc. The secondary maximum occurs fourteen minutes after the upper culmination, and amounts to 10.8 seconds. The principal eastern maximum of variation takes place six hours and seventeen minutes after the lower culmination, the deflection being 13.2 seconds. The secondary easterly maximum occurs at six hours three minutes after the upper transit, and amounts to 11.4 seconds.

The effect of the moon appears to be subject to a variation depending on the solar year, for the investigation of which the preceding results were arranged in two groups—one containing the hourly values for

the summer months, and the others those for the winter months. After being subjected to a similar process of reduction, it was found from these that the lunar variation is much smaller in amplitude in winter than in summer, and also that the maxima and minima occur earlier in the former than in the latter season, the winter curve preceding the summer curve by about an hour and three quarters.

Professor Bache next proceeded to ascertain whether the phases, declination, or parallax of the moon have any sensible effect on the magnetic variation. Dr. Kreil, from the discussion of ten years' observation at Prague, concluded that there was no specific change in the position of the magnet depending on the moon's phases or parallax, but that the variation was sensibly greater when the moon was at its greatest northern declination. On the contrary, Mr. Brown, from a much shorter series of observations in India, inferred that there was a minimum of variation two days after the full moon. To investigate these points, the lunar variation for the days of full and new moon, and for two succeeding days, were compared with the average monthly variation; the results indicate that the north end of the magnet is deflected six seconds to the westward at full moon, and as much to the eastward on the day of new moon. This quantity is not much beyond the probable error of observation, but a more definite result could hardly be expected from a series extending over but five years. The period of the observations is also too short to exhibit any definite variation depending on the moon's greatest northern or southern declination, and the same remark may be applied to the effect of the varying distance of the moon. Professor Bache proposes, in another paper, to extend the discussion to the moon's influence on the variation in the intensity of the magnetic force of the earth.

I neglected to mention in the last report that, besides the magnetic observations made by Professor Bache in coöperation with the system inaugurated by the British association, two other series were carried on simultaneously—one in the city of Washington, by Lieutenant Gilliss, of the United States Navy, and the other by Professor Bond, of Harvard University. The observations of Lieutenant Gilliss were made once in two hours with a bar eleven inches long, observed with a micrometer microscope reading to seconds of arc, and were continued from July 7, 1840, to June 30, 1842, a period of two years. Beside the bi-hourly series, another was made on term days, viz: on the 23d and 24th of each month, from September, 1840, to June, 1842, in which the position of the needle was recorded at intervals of every five minutes. Professor Bond's observations at Cambridge extended

from 1837 to 1845. The observations of Lieutenant Gilliss were published by order of the Senate of the United States; but have not been discussed in reference to the various influences to which the needle is subjected. Those of Professor Bond are still in manuscript, but will probably be published in due time, as a part of the labors of the Harvard observatory.

The fact was mentioned in the last report, that a small appropriation had been made, to assist in defraying the expense of the necessary material and apparatus for an investigation undertaken by Professor Wolcott Gibbs relative to the ores of platinum, of which the following is an account:

Samples of the ores of platinum, according to Gmelin, were first brought to Europe in the year 1741. In 1748, the metal was described by Don Antonio de Ulloa as a metallic stone, which, when present in large quantity, prevents the working of the gold ores. Watson recognized platinum as a distinct metal in 1750, and after that period very numerous investigations were published in regard to it. In 1804, Wollaston announced the discovery of palladium and rhodium in the raw platinum ores, and shortly afterward Smithson Tennant showed that the same ore contained two other metals, which he called iridium and osmium. Finally, in 1844, Claus discovered ruthenium. The investigation of the metals accompanying platinum has always been regarded as one of peculiar difficulty, in consequence of the remarkable analogies between the chemical properties of the metals themselves. The comparatively recent discovery of ruthenium illustrates this point in a striking manner. All previous investigations related chiefly to mixtures of the metals in various proportions, hardly a single one having been obtained in a state of purity. Claus's most elaborate and successful investigation threw a new light on the whole subject, without, however, removing all the difficulties which accompany a complete separation of the different metals. In 1859, Deville and Debray published a detailed memoir on the working of the ores of platinum upon a large scale, and on the physical properties of the different metals. In this very valuable paper, methods of fusing large quantities of platinum are given, the processes employed being, however, essentially the same as those successfully used in this country by Dr. Hare many years since.

The purely chemical question of the complete separation of the different metals of the platinum group from each other, remained unsolved. The investigations of Dr. Gibbs have been undertaken partly to supply this deficiency, and partly in consequence of his dis-

covery of a very remarkable series of compounds containing osmium, ruthenium, or iridium. These investigations have thus far been successful, a few difficulties only remaining to be overcome. They have not merely yielded wholly new methods of separation, but have resulted in the discovery of an entirely new class of salts, possessing much theoretical and practical interest. It is by means of these salts that Dr. Gibbs has succeeded in effecting a satisfactory separation of the different metals of the group. The memoir embodying a detailed description of the processes of Dr. Gibbs will consist of four parts. The first will treat of the methods of bringing the ores into a soluble condition; the second, of the methods of separating the metals from each other; the third, of the new salts and bases discovered; and the fourth, of the general relations of the metals of the group. A large part of the work is already completed, and the author expects to have the whole ready for the press is a few months.

Beside the papers described, a number of others have been accepted for publication, or are in preparation, at the expense of the Smithsonian fund. Among the former we may mention an elaborate memoir on the anatomy of the human liver, by Dr. Schmidt, of New Orleans, of which the following are the principal points: 1. The accumulation of additional evidence of the existence of a network of capillary vessels previously discovered by the author, and described by him as "biliary tubules," from which start the smallest hepatic ducts. This network is independent of that in which the smallest branches of the porta-vein, hepatic artery, and veins arise. 2. The discovery of minute lymphatics of the liver, and their origin in the network of biliary tubules, by which a communication between the hepatic ducts and lymphatics is established. 3. The discovery of lymphatic vessels, *directly* joining small hepatic ducts, by which a *second* communication between these vessels is established. 4. A minute description of a system of small follicular and racemose glands, the ducts of which form extensive plexuses throughout the liver, and their relationship to the other constituents of the organ. These glands have been imperfectly described by some authors, but their true relations have never been known. 5. The discovery of a communication of the lymphatics with the ducts of these glands. As many of the latter join the hepatic ducts, a *third* communication between the lymphatics and hepatic ducts is thus *indirectly* established.

The memoir also contains several other points of minor importance, together with a minute description of the blood vessels, hepatic cells, &c., perhaps more definite than has heretofore been given. The dis-

covery of a natural communication between the hepatic ducts and lymphatics of the liver, according to the author, is of great importance, for it explains the phenomena of jaundice as they occur in certain diseases. It also explains why the large lymphatics on the surface of the liver are frequently found filled with bile after death. The appendix to the memoir contains a description of the best method of making minute injections, together with the apparatus used for the purpose.

In addition to the foregoing, an original mathematical paper on the intersection of circles and spheres, has been presented by Major Alvord, of the United States Army.

Among the memoirs in preparation is one on Arctic meteorology, from the original observations made under the direction of Sir F. Leopold McClintock, during his late voyage in search of Sir John Franklin, and presented to this Institution by the author, for discussion and publication. A full account of this paper and the preceding will be given in the next annual report.

Under the head of *Smithsonian Miscellaneous Collections*, the following works have been published during the past year:

1. Instructions in reference to collecting nests and eggs of North American birds; illustrated with wood cuts.

2. Circular in reference to the history of North American grasshoppers; prepared by Mr. P. R. Uhler.

3. Circular in reference to collecting North American shells.

4. Circular addressed to the officers of the Hudson's Bay Company, relative to the registration of meteorological phenomena, and the collection of objects of natural history. This circular is accompanied by a letter from the late Sir George Simpson, governor of the Hudson's Bay Company's territory, commending the requests of the Institution to the favorable consideration of all persons connected with the company.

5. Check lists of the shells of North America, prepared for the Institution by Isaac Lea, P. P. Carpenter, W. Stimpson, W. G. Binney, and T. Prime. These lists were prepared for the purpose of labeling the specimens in the Smithsonian collection, but as it was thought they would be of general value in the indication of species inhabiting this continent and the adjacent islands, in facilitating the preparation of catalogues, the labeling of collections, and conducting exchanges, it has been thought proper to print them for distribution.

6. List of duplicate shells of the Indo-Pacific Fauna, collected by the United States exploring expedition under Captain Wilkes.

7. Catalogue of the described lepidoptera of North America, by Dr. John G. Morris. This catalogue enumerates over 2,000 species of butterflies, moths, &c., which occur in the United States proper. "Yet there is reason to believe," says the author, "that hundreds still remain to be discovered." In the preparation of this catalogue, all accessible books have been consulted, and it is believed that few descriptions of American lepidoptera have been overlooked. The classification adopted is that recommended in part by Herrich-Schaeffer and Walker; but in some of the families, Guénée has been followed.

The following works are in preparation for publication in the Smithsonian miscellaneous collections:

1. Elementary introduction to the study of conchology, by P. P. Carpenter, of Warrington, England.
2. List of the species of shells collected by the United States exploring expedition, by the same author.
3. Descriptive catalogue of the shells of the west coast of the United States, Mexico, and Central America, by the same author.
4. Bibliography of North American conchology, by W. G. Binney.
5. Descriptive catalogue of the air-breathing shells of North America, by the same author.
6. Catalogue of North American crustacea, in the museum of the Smithsonian Institution, by W. Stimpson, M. D.
7. Catalogue of the described Neuroptera of North America, by Dr. H. Hagen; edited by P. R. Uhler.
8. Classification of the Coleoptera of North America, by Dr. John L. Le Conte.
9. Descriptive list of the diurnal lepidoptera of North America, by Dr. J. G. Morris.
10. Descriptive catalogue of the hymenoptera of North America, by H. De Saussure.
11. Descriptive catalogue of the diptera of North America, by Dr. Dr. H. Loew and Baron Osten Sacken.
12. Catalogue of North American orthoptera, hemiptera, and homoptera, by P. R. Uhler.

Most of these are nearly completed, and will be published during the year 1861.

The thanks of the Institution are due to the gentlemen whose names have been mentioned in connection with the preparation of the several works just mentioned, since their labors have been bestowed for the advance of science, without any other reward than that which might flow from the reputation justly due to the authors of such productions.

The works on insects have been prepared especially to facilitate the study of this branch of natural history—a taste for which has much increased in this country of late years, principally through the exertions of the Smithsonian Institution; and it is believed that, with the growing enthusiasm manifested for this study, specimens of nearly all the species which inhabit North America will soon be collected and accurately described. The practical bearing of a knowledge of entomology, in its application to agriculture and the arts, as well as in its scientific relation to general zoölogy and physical geography, have been pointed out in previous reports. I may mention, however, as an interesting fact exhibiting the relation of animal life to the peculiarities of climate and soil in different parts of the world, that Baron Osten Sacken has ascertained that the same species of insects which inhabit the arid plains of the western portion of our continent are nearly identical with those found on the steppes of Russia.

The next class of publications of the Institution consists of the series of annual *Reports* to Congress. The first reports were in pamphlet form, and merely gave an account of the operations of the Institution and the proceedings of the Regents. Each report, however, since 1853, consists of a volume in which is given, in an appendix, some of the lectures delivered at the Institution, extracts from correspondence, and information of a character suited to the meteorological observers and other persons interested in the promotion of knowledge. The first volume of this series (that for 1853) contains a reprint of all the previous reports of the Secretary, the will of Smithson, the act of organization, and all the facts necessary to a history of the establishment from its commencement. The report for 1859 contains the usual amount of matter, which has thus far been restricted by the action of Congress to 450 pages. The number of copies printed by order of Congress was 10,000, of which only 4,500 were given to the Institution for distribution; whereas, of the report for 1858, the Institution received 7,000 copies. On account of this reduction in the number of copies, we have been obliged to curtail the list of distribution, and to confine it principally to our meteorological observers and to those who have manifested their interest in the work by making special application for it.

In order to ascertain whether the publications of the Institution are received by the persons to whom they are addressed, a printed form of acknowledgment is sent, to be returned with the signature, post office, and occupation of the recipient. The receipts, which have been carefully bound in a series of volumes as vouchers for the faithful discharge

of this part of the operations of the establishment, furnish some interesting statistics as to the occupation, and distribution in the different parts of the country, of the readers of the Smithsonian reports.

Meteorology.—An appropriation is annually made by Congress for "the collection of agricultural statistics, investigations for promoting agriculture and rural economy," &c. Of this, Judge Mason, during his term of office as Commissioner of Patents, devoted a small portion to assist the Smithsonian Institution in collecting and reducing meteorological observations. He considered this kind of information as one of the essential elements on which to found a system of scientific agriculture adapted to the various local climates of the different parts of our extended country, and in his estimates presented to Congress for an increased appropriation, a certain sum was specified as requisite for this important purpose. In his report for 1856, he properly remarks "that the degree of heat, cold, and moisture in various localities, and the usual periods of their occurrence, together with their effects upon different agricultural productions, are of incalculable importance in searching into the laws by which the growth of such products is regulated, and will enable the agriculturist to judge with some degree of certainty whether any given article can be profitably cultivated." In accordance with these views, an increased appropriation was made by Congress, which has been continued until the present time. The part of the appropriation originally devoted to meteorology was also continued by the successors of Judge Mason, until last year, when it was suddenly and unexpectedly suspended.

The sum thus furnished by the agricultural department of the Patent Office was scarcely more than one third of that appropriated by the Smithsonian Institution. It was, however, of essential service in developing the system and in assisting to defray the heavy expense of blanks and reductions.

The general results of all the observations for six years have been presented in a report to Congress, in the joint name of the Smithsonian Institution and the Patent Office, and are now in the hands of the public printer. The information which is contained in this report is such as is almost constantly called for by the public, and forms a part of the data necessary to base the practice of agriculture upon the reliable principles of insurance, as well as to indicate the climate especially adapted to particular productions. The value, however, of such materials depends upon the number of years during which the observations are continued, and I therefore regret that the late Commissioner of

Patents did not see fit to continue the appropriation which had been made by his predecessors. The system was fully organized and the investigation was considered of too much importance to be abandoned, particularly after so much labor had been bestowed upon it, and therefore it has since been maintained at the sole expense of the Institution. We are sorry, however, that we were obliged to stop the reductions, but hope they will be resumed again before the observations have accumulated to an unwieldy bulk.

The whole system of meteorology is still in a prosperous condition; the number of observers reporting directly to the Institution is about 500; the number of stations reporting to the Surgeon General's office of the War Department is 75. The returns of fourteen stations in Canada are also accessible to the Institution. Observations have been made for the year 1860 at 166 light-houses on the Atlantic and Lake coasts, under the direction of the Light-House Board, copies of which are sent through the Institution to the Board of Trade in England.

The lake system, established under the direction of Captain Meade, of the Topographical Engineers, is still continued. It consists of eighteen stations on lakes Superior, Michigan, Huron, Erie, and Ontario. Each station is furnished with a full set of standard instruments constructed on the plan adopted by the Smithsonian Institution. The observations are regularly taken four times a day at equal intervals of three hours, besides occasional series at certain places at every hour of the twenty-four. The latter are of much value in determining the corrections to be applied to the mean derived from observations taken at a few hours in the day. This system in its extent, the precision of its instruments, and the character of its observers, is one of the most perfect which has ever been established, and if continued for a few years, will give the local climate of the district, with an accuracy which has never been attained in any other part of the continent.

The observations of Lieutenant Williamson, in California, on the hourly fluctuations of the barometer at the level of the ocean and at points on mountain stations, were continued until the end of the last fiscal year, when they were stopped for the want of further appropriations. It is to be hoped the Secretary of War will make provision for renewing these important investigations, since they are not only of great scientific interest, but also of much practical value in correcting the observations for heights by the barometer. Indeed, with the advance of science, a revision of the deductions from all the observations which have been made by the various exploring parties, will be

required, in view of the greater accuracy attainable by the application of corrections derived from observations of this kind.

The Institution has received during the past year a number of valuable meteorological records from officers of the Hudson's Bay Company in different parts of the territory. Among these is a series from Fort Simpson, McKenzie's river, for twelve years, transmitted by B. R. Ross, Esq., chief trader; and another series, for three years, by J. McKenzie, Esq., from Moose Factory, both of which will be continued hereafter. In this connection we may mention that a number of spirit thermometers for marking the extremes of cold have been distributed, through the agency of Mr. Kennicott, to some of the most distant posts of the Hudson's Bay Company.

The daily telegraphic dispatches of the weather from different parts of the country have been kept up with considerable regularity from the South as far as New Orleans; but we regret that frequent intermissions take place in the receipt of the telegrams from places directly west of the city of Washington, especially as we are more immediately interested in these, since they afford the means of predicting with considerable certainty the character of the weather sometimes a day or more in advance.

Besides the sources we have mentioned from which meteorological records have been obtained, an account of others from which communications on the same subject have been received, is given in the special appendix to the Secretary's report. The amount of climatic materials relative to different parts of the continent of North America which has been collected by the Institution is of great value; but it cannot be rendered fully available for general use without a larger expenditure of money than can be devoted to this object by the Smithsonian income.

All the accounts collected by the Institution of the remarkable auroras of August and September, 1859, were placed in the hands of Professor Loomis, and by him discussed and published in the "American Journal of Science."

During the past year, meteorological instruments have been furnished to two expeditions under the direction of the Coast Survey to observe the great solar eclipse of the 18th of July, 1860. One of these was sent to Labrador under the charge of Professor S. Alexander, of the College of New Jersey, and the other to Washington Territory under Lieutenant Gilliss. The instruments, in both cases, have been returned in good condition.

A full set of meteorological instruments and other apparatus has

been furnished to Dr. I. I. Hayes, who has undertaken a new exploration in the Arctic regions for the purpose of gaining additional information as to the existence of an open sea. It is probable that Dr. Hayes will spend the present winter at some point on the coast of Greenland; and if he should do so, he has promised to make good use of the instruments and to adopt measures by which the records of the observations may be transmitted to Washington.

The summer of 1860 was rendered remarkable by the occurrence of a number of tornadoes in different parts of the northern and western portions of the United States. Some of these were of so peculiar a character, and their destructive effects were so extensive, that it was thought a matter of sufficient importance to adopt means for their special investigation. For this purpose it was deemed advisable to send a competent observer to make an accurate survey of the region passed over by the meteors, and to collect all the facts which might tend in the least degree to throw light upon the character of these terrific visitors. The person chosen for this service was Mr. W. L. Nicholson, of the United States Coast Survey, who undertook the investigation for the sake of science; his actual expenses alone, exclusive of transportation, being paid, and a free passage having been secured for him by the Institution through the commendable liberality which characterizes the acts of many of our railroad companies.

The most violent of these storms was that of June 3, in Iowa and Illinois, which swept over more than 600 miles, destroying three towns and perhaps two hundred persons, besides domestic animals and other property to a large amount.

In regard to these remarkable disturbances of the atmosphere, Mr. Nicholson collected a great number of interesting facts, by personal inspection of the effects which still remained, from oral information derived from many eye witnesses, and from actual surveys of the paths of the tornadoes and the relative position of the more prominent objects which remained strewed in their course. These will all be presented in proper form to the Institution as a report of actual facts; and it is proposed by the Secretary to discuss the phenomena in connection with the various theories which have been advanced to explain the origin and progress of storms of this character. Attention was not exclusively confined to meteorological phenomena, but was extended to the physical and other peculiarities of the regions visited; and Mr. Nicholson endeavored to diffuse a taste for meteorology among the people, which it is hoped will in the future supply some vacancies in our corps of observers. He warmly expresses his gratification on account of the

liberality with which he was aided, the general appreciation of the objects of the Institution, and the courtesy everywhere extended to him personally.

It was mentioned in the last report that a commencement had been made, in connection with the Coast Survey, in the preparation of a hypsometrical map of the United States, and that the elevation of upwards of 9,000 points had been collected. This work has been continued during the past year, and efforts have been made to obtain materials existing in the offices of various railroads and public works, and it has been deemed desirable still further to prosecute the research among the archives at the State capitols. About 4,000 additional elevations have thus been obtained, and considerable progress made in the plotting of the material on the sheets of the hypsometrical map.

In furtherance of the same object, a small appropriation in addition to the previous loan of instruments has been made to Prof. Guyot, to assist in a hypsometrical survey of the Apalachian chain of mountains. During the last two or three years, this accomplished geographer has spent a considerable portion of the summer in North Carolina, and has now nearly ready for publication a map of the part of the Apalachian system in that region. He has extended a net work of triangles over an area of nearly 150 miles in length, and determined within these, by a series of contemporaneous barometric observations, the heights of all the more important peaks.

In the report of his labors to the Institution, Professor Guyot makes the following remarks: "I only deplore the absence of points the position of which is determined astronomically or otherwise with sufficient accuracy to enable me to locate my survey on the right spot of the surface of the globe. The existing maps are very deficient in every respect." In connection with this subject, I may be permitted to express the hope that Congress will in due time make provision for extending the system of triangulation which has been established with so much labor and precision along the sea-board to the interior of the continent. The necessity of such a work must every year become more and more evident, as the value of land increases and the precise definition of political boundaries becomes more important.

Ethnology.—Whatever relates to the nature of man is interesting to the students of every branch of knowledge; and hence ethnology affords a common ground on which the cultivators of physical science, of natural history, of archæology, of language, of history and literature,

can all harmoniously labor. Consequently, no part of the operations of this Institution has been more generally popular than that which relates to this subject.

From the preceding reports, it will be seen that the Institution has endeavored especially to promote that part of the general subject of ethnology which relates to language; and as in this an increasing number of the intelligent public is interested, the publication of the Dakota and Yoruba grammar and dictionary was received with much favor, and more numerous applications have been made for copies of these works than for almost any others which have been issued by the Institution. Indeed, the entire edition of the Dakota grammar and dictionary, except the copies bound up in the volumes of the series of contributions, has been exhausted. The work has not only been considered of value to the students of ethnology, but also to the officers of the government, missionaries, and others who have been called upon to hold intercourse with our western Indians.

During the past year several works of the same class have been offered to the Institution for publication. Some of these, however, were not in a condition to be printed without revision and philosophical arrangement; and since the death of the lamented Professor Turner, we have experienced difficulty in finding a person of the peculiar skill and learning required for the undertaking of so responsible and difficult a work. We have, however, referred several of the articles presented to us to the American Oriental Society, and have been favored with the advice and assistance of the officers of that association, in enabling us to decide on the disposition of such works; and among these, the Institution is particularly indebted to Prof. W. D. Whitney, of Yale College, for the important service he has rendered us in this line.

Several of the grammars and dictionaries which have been presented were approved, and would have been published by the Institution, had not other means been provided for giving them to the public more expeditiously. Among these, are a grammar of the Grebo language by Bishop Payne, of Africa, which will be printed by the American Oriental Society; and also a Creek grammar and dictionary prepared by Mr. Buckner, and about to be published by the Baptist Missionary Board.

Much interest has been manifested by the students of ethnology in everything which relates to the Indians of the Pacific coast of North America; and the Institution is accordingly desirous to collect all the reliable information on this subject which it can possibly obtain. In

this labor it has been much assisted by Alexander S. Taylor, Esq., of Monterey, California, through whose instrumentality we have received a collection of original manuscripts, of which the following is a description:

1. A vocabulary of the Mutsun Indians of San Juan Bautista, by Padre Felipe Arroyo, consisting of ninety-two folio pages, written in 1815, and sent to the Institution by the Rev. John Cuenelias, of Monterey.

2. A grammar of the same language by Arroyo, also written in 1815, and found at the mission of Santa Yrez, in Santa Barbara county, by the Rev. C. Rubio, principal of the college of that place, by whom it is lent to the Institution. This grammar was copied from Arroyo's manuscripts, in a small octavo, of seventy-six pages, in a clear beautiful hand, by one of the friars, and is a curiosity of its kind. It had been hidden at the old mission where Father Arroyo died, for over forty years.

3. An extensive vocabulary of the Indians of San Antonio Mission, of about ninety quarto pages, prepared by Padre Buenaventura Sitgar, one of the original founders of California, and Padre Miguel Pieras, between 1771 and 1797.

4. A catechism of the Chalonese language of the mission of Soledad, written out by Father Vincente Fio de Sarria about 1819, was also found at San Antonio Mission, and forwarded, with the vocabulary of Sitgar, by Rev. D. Ambris, curate of Monterey.

5. A catechism in the language of the San Antonio Mission, with a Spanish translation written by Friar Pedro Cabot, in 1817. This was copied from a wooden tablet used by the missionaries to instruct the Indians at church, and was presented to the Institution by Mr. Taylor, according to whom, Friar Cabot was one of the best educated Spanish missionaries, and justly celebrated among the people of the country for his piety and excellence of heart. He died about 1836.

We are informed by Mr. Taylor that, at his earnest request, one of the learned professors in the college of Santa Clara has undertaken, in behalf of the Institution, to prepare a vocabulary and grammar of the language of the Flat Head Indians of Oregon, among whom he labored as a missionary for many years.

The Mutsun vocabulary has been carefully copied, at the expense of the Institution, by Mr. Cotheal, of New York, and the original returned to the reverend gentleman to whom we are indebted for its use. The other articles mentioned, which are not given to the Institution, will also be copied, and the originals returned. In this way, these

valuable contributions to philology, if not printed, will be preserved and rendered more accessible to the ethnological student.

At the suggestion of Mr. Taylor, we have prepared a circular addressed to the Catholic clergymen, missionaries, and institutions of California, Oregon, Washington, Vancouver's Island, British Columbia, Utah, Arizona, and New Mexico, asking for copies of all Indian vocabularies, grammars, catechisms, and other philological materials, made or collected by the priests who labored among the aborigines, and which, we are informed, are still to be found in many of the mission stations. In Alta California alone, it is said that there are twenty-one missions, in which are preserved books of baptisms, marriages, and deaths of the Indians from 1769 to 1846.

Mr. George Gibbs, formerly of New York, during a residence of twelve years on the Pacific coast, has devoted much time to collecting materials for the illustration of the ethnology of the country. He has obtained over fifty vocabularies of the various languages and dialects spoken along the coast from Behring's straits to San Francisco, and further south; many of which are accompanied by special memoirs by intelligent gentlemen residing among particular tribes or families, and who are well acquainted with their respective idioms. Mr. Gibbs is at present engaged in arranging his materials with a view to present them to this Institution. By the collection and publication of all the materials of this class which can be obtained, additions may be made of importance to the ethnologist, in solving many questions as to the general philosophy of language, and the connection of the different families of American Indians with each other and with different races of mankind.

A considerable number of answers have been received to the circular addressed by the Institution to the foreign agents of the government, missionaries, and other persons in all parts of the world, relative to the investigation as to the system of relationship adopted by different tribes, nations, and races of mankind, mentioned in the last report, as undertaken by Mr. Morgan. These letters have been sent to Mr. Morgan, who has, in turn, acknowledged his indebtedness to the Institution for the valuable aid rendered him in the prosecution of his research.

Some years ago a memoir was submitted to the Institution, on the physical peculiarities of the European man in America, by a gentleman of Cincinnati, which was found to contain a large amount of interesting matter, but scarcely sufficient data to warrant a safe induction as to the subject of investigation. A similar inquiry has been insti-

tuted by members of the Academy of Natural Sciences of Philadelphia, and in coöperation with these, a circular has been issued by the Institution, asking for statistics relative to the place of birth, country of parentage, profession or occupation, age, height, and weight of native-born American citizens. To this circular about one hundred answers have been returned from our meteorological correspondents, the whole series furnishing the facts relative to about two thousand individuals. It is intended to present the statistics thus obtained to the author of the memoir above mentioned, as well as to the Academy of Sciences. It will, however, be evident, on reflection, that the value of such statistics must depend on the number of cases which they include, and the length of time through which they are continued; since it is highly probable that the changes produced by climate and other conditions of existence, become marked only after a succession of generations have been exposed to the modifying influences.

The Institution continues to receive from time to time, information respecting the existence of mounds and other remains of the original inhabitants of this continent not previously described, and since the proposition has been entertained of preparing a map to illustrate the relative distribution of these remains, all information of this kind will be very acceptable.

A paper has been some time in possession of the Institution, on the mining operations of the ancient inhabitants of the region around Lake Superior, but it is not yet in a sufficiently elaborate condition to be presented to the public through the Smithsonian Contributions. We hope, however, that in the course of the year we shall be able to have it revised and prepared for the press. It may be proper also to mention, in this connection, that a large number of crania of different tribes of Indians, as well as of different races of men, has been collected together at the Institution, the study of which would probably furnish some new facts of interest to the ethnologist.

Magnetic Observatory.—It was stated in the last report that, as the changes in the direction and intensity of the magnetic force at Toronto were found to be almost precisely the same as at Philadelphia and Washington, it had therefore been concluded that more important service could be rendered science by making the observations at a greater distance from Toronto than the grounds of the Smithsonian Institution. In accordance with this conclusion, the instruments of the observatory, jointly supported by the Smithsonian Institution and the Coast Survey, have been sent to Key West, where the United States government has a fortification, and the Coast Survey maintains

a tidal station. Key West is situated in latitude 24° 33′ north, longitude 81° 41′ west, and is a low coral island, rising at no point more than ten or twelve feet above the sea. The mean temperature of the spring is 75°, of summer 82°, of autumn 78°, and winter 69°. The daily variation of temperature is therefore very small, and on this account as well as from its position, the island is well adapted to magnetic observations.

The observatory is situated on the grounds of the government, a few hundred yards from Fort Taylor, and near the water. A large shed belonging to the fort was made use of, by permission of the engineer department, as an outer protection for an inner building containing the instruments. The inner rooms were properly inclosed in a substantial manner, leaving a clear space between their walls and those of the outer building for the free circulation of air. The piers supporting the instruments rest upon the solid rock of the island, and are therefore subject to no other changes than those which result from the slight annual variation of temperature. A small building to the north of the observatory was erected for the instruments employed to determine the absolute values of the magnetic elements, to be used in connection with the continuous photographic records of the variations.

The instruments were mounted at Key West in January and February, 1860, by Prof. W. P. Trowbridge, assistant in the United States Coast Survey, and a series of observations commenced by this gentleman, assisted by Mr. Samuel Walker, in March, have been continued to the present time, under the charge of Mr. George D. Allen, who is now retained as permanent observer. The expense of the observations is sustained jointly by the Smithsonian Institution and the Coast Survey. In the appendix to the last report will be found a minute description of the self-recording instruments here referred to, and of the method of using them, prepared by Mr. J. E. Hilgard; and in the appendix to the present report it is proposed to insert a communication from Gen. Sabine to the Royal Society of London, giving a brief exposition of the laws of the phenomena of the larger magnetic disturbances, as far as they have been ascertained, and of the interesting contributions to science which such observations as are now made at Key West may be the means of affording.

Laboratory.—During the last year the laboratory has remained under the direction of Dr. B. F. Craig, of this city, and, as in former years, many minerals from different parts of the country, submitted to the Institution for examination, have been reported upon. It

may be proper here to repeat the statement which has previously been made as to the policy adopted in regard to examinations of this kind, namely: to furnish an account of the character of the mineral free of cost to the parties asking the information, provided it is of general interest, or immediately connected with the advance of science, and can be afforded at little expense to the Institution. If, however, the information required is for private interests, a charge is made sufficient to cover the expense of the investigation. By the adoption of this policy, the laboratory has been kept in operation by means of a small annual appropriation for chemicals and apparatus.

Collections of Natural History, &c.—The Smithsonian Institution, during the twelve years of its active existence, has expended a large amount of labor and money in collecting and preserving specimens of geology, natural history, and ethnology, and has also received the entire charge of all the specimens collected by the various expeditions of the general Government. The scientific material thus collected is very valuable, and, in number and variety of specimens and duplicates to illustrate the natural productions of the North American continent, far excels any other collection ever made. It is not the policy of the Institution to hoard up specimens for the exclusive study of those immediately connected with the establishment, or to consider the duplicates merely as articles of commercial value, only to be exchanged for marketable equivalents, but to render them available as widely as possible for the advance of knowledge. In accordance with this policy, arrangements have been commenced for a more general distribution of the type and duplicates, and for the description of new species, than has heretofore been practicable.

The specimens may be divided into two classes: first, those which have been described in the reports of the Government expeditions, or in the transactions of the Smithsonian and other institutions; and second, those which have not yet been described, and which consequently are considered of much value to the naturalists who desire to gratify the laudable ambition of connecting their names with original accounts of new species, or who are engaged in preparing monographs of particular families. Of both classes the Institution possesses an immense number of duplicates, in the disposition of which, some general principles should be kept constantly in view. After due consultation and deliberation the following rules for the first class, and considerations for the second, are proposed.

First. To advance original science, the duplicate type specimens

should be distributed as widely as possible to scientific institutions in this country and abroad, in order that they may be used in identifying the species and genera which have been described.

Second. To promote education, as full sets as possible of general duplicates, properly labeled, should be presented to colleges and other institutions of learning that profess to teach the principal branches of natural history.

Third. It should be distinctly understood that due credit is to be given to the Institution in the labeling of the specimens, and in all accounts which may be published of them, since such credit is not only due to the name of Smithson, but also to the directors of the establishment as vouchers to the world that they are faithfully carrying out the intention of the bequest.

Fourth. It may be proper in the distribution to institutions abroad, as a general rule, to require, in case type specimens to illustrate species which have been described by foreign authors may be wanted for comparison or other uses in this country, that they be furnished at any time they may be required.

Fifth. In return for specimens which may be presented to colleges and other educational establishments, collections from localities in their vicinity, which may be desirable, shall be furnished when required.

The disposition of the undescribed specimens in the collection of the Institution is a matter which requires special consideration, and involves in every case of application for the use of them the necessity of deliberation to guard against the falling of the specimens into improper hands, and prevent as far as possible the charge of favoritism.

It is not impossible that in some cases, hasty and imperfect descriptions have been published of specimens belonging to the Institution, through the desire of the author to connect his name with a new species, rather than from an honest endeavor to advance knowledge. It would, however, have been difficult to refuse any person the privilege of examining new species, who professed to be actuated alone by the desire of having an opportunity of laboring in a particular field of investigation; but it is clear that special encouragement and preference should be given to those who undertake the more difficult and laborious task of forming complete monographs.

It is not in accordance with the policy of the Institution to subject a person who is engaged in a special line of research, to the expense of residing in Washington during the period perhaps of many months required for the investigation, but, when necessary, he is allowed to

take the materials to his home to study them at his leisure, provided the Institution is satisfied as to his competency, his integrity, and industry. But in granting this privilege, some restriction should be put upon the time the specimens may be retained by the investigator, and also upon the number he may have at once in his possession. He should also give assurance that he will prepare a set of type specimens properly labeled for preservation in the Smithsonian museum, and that all the duplicates, if required, shall be returned to the general collection.

The proper distribution of the duplicate specimens is a work of great labor and expense. It does not consist merely in assorting and packing them for transportation, but also in properly numbering and labeling them for immediate use. Without these preliminaries, the specimens themselves would be of comparatively little value. For example, we may send to an educational establishment a series of specimens, many of which are to be found in its immediate vicinity, and yet be of great value on account of having attached to them the scientific names by which they are known to men of science in every part of the civilized world, and without which all that may be stated in regard to them in books would have no interest for want of certainty as to the identity of the objects described.

To illustrate the details of the system of distribution, I may mention the plan adopted in regard to the shells and minerals. Of these, a complete series, consisting of a full representation of each species, is in the process of being accurately labeled, and when this work is completed, the whole collection of duplicates will be assorted in boxes or bins, each apartment containing those belonging to the same species. Each shell or mineral in the same box will then be marked with the same number, corresponding with a number on a list of printed labels, two copies of which will be sent to each recipient of a collection; one to be preserved for reference and the other to be cut up into labels to be attached to the specimens. After this preparation and arrangement, individual series are made up by taking a single specimen from each box. This operation demands a critical knowledge of each particular class of specimens, and consequently requires the coöperation of a number of experienced naturalists, each an acknowledged authority in his special department.

From the foregoing account it must be clear that the labor and time required even to prepare a few sets of specimens for distribution, is much greater than at first sight might be imagined; and since the number of suites of specimens in the Smithsonian collection amounts in some cases to several hundred, it is evident that the expense must

exceed the unaided means of the Institution, unless the time of completing the distribution be extended over a number of years.

In accordance with the plan described, a commencement has been made in the work, preparatory to the general distribution. The assortment and labeling of an entire set of shells has been principally intrusted to Mr. Philip Carpenter, of Warrington, England, one of the first conchologists of the day, who has prepared a report on the shells of the northwest coast of the United States for the British Association. In this work Mr. Carpenter has been assisted by the gratuitous labor of Mr. Isaac Lea, Dr. A. A. Gould, Dr. E. Foreman, Mr. W. G. Binney, Dr. W. Stimpson, and Mr. Temple Prime.

The botanical collection has been placed in the hands of Dr. John Torrey, of New York, who has generously offered, with the coöperation of Dr. Gray, of Harvard University, to superintend the labeling of a complete set of specimens to be preserved in the museum of this Institution, of several sets of original type series, to be presented to some of the principal museums of this country and of Europe, and the preparation of the remainder for distribution to colleges and academies.

The arrangement of the specimens of the other branches of natural history has been commenced and laboriously prosecuted under the direction of Professor Baird, who has been assisted especially by Dr. H. Bryant, Mr. Theodore Gill, and a number of amateur naturalists.

In accordance with the policy of rendering the collections of new material immediately available for the advance of science, a number of series of specimens of different genera and species have been intrusted for study and description to different gentlemen interested in special branches of natural history. The service which has been rendered the cause of natural history by this liberal course is far greater than might at first sight appear.

It may be safely asserted that scarcely any extended investigation in the line of natural history has been prosecuted in this country during the last ten years without having its material in greater or less part furnished by the Institution.

Explorations.—During the past year the collections have been increased by a number of expeditions under the direction of the different departments of the general government, and by explorations in part at the expense and under the direction of the Institution. Of these a detailed history is given in the report of Professor Baird herewith presented, and it is only necessary for me in this connection to mention some of the latter sources of the increase of specimens.

Mr. Robert Kennicott, the enterprising young naturalist mentioned in the last report, has continued his explorations in the Hudson's Bay territory and Russian America, and his labors have, as in previous years, received the cordial coöperation of all the officers and agents of the Hudson's Bay Company. Not only has he been permitted to visit and reside at the different posts, but he has received free transportation of himself and collections. Mr. Kennicott will further extend his explorations into Russian America, and will probably remain absent until the autumn of 1863.

Mr. John Xantus, whose name has also been mentioned in some of the previous reports, has industriously occupied his time not devoted to tidal observations for the Coast Survey at Cape St. Lucas, in Lower California, in completing the collections of the natural history of that region. The specimens he has obtained on the western coast are greater in number and variety, according to Professor Baird, than those ever collected in that region by any single individual.

Mr. C. Drexler, under the special direction of the Institution, during the last year made an exploration in the region of James' Bay, and in this case also the Hudson's Bay Company liberally seconded the objects of the Institution. He was enabled to collect a large number of valuable specimens through the facilities afforded him, and these were sent from Moose factory to London, at the expense of the company; and thence to this country by the Cunard steamers, free of charge; acts of liberality which deserve to be specially noticed, not only as examples of gratifying appreciation of science, but also of the efforts of the Institution to enlarge its boundaries.

Museum.—What has been said under the head of collections may serve to illustrate the service which the Institution might have rendered to natural history without having established a public museum, and incurred the expense of the erection of a large building and the continued cost of supporting its necessary establishment of numerous employés. The act of Congress, however, authorized the erection of a building for the reception of objects of natural history, under the idea, then prevalent, that such a provision was absolutely necessary for carrying out the will of the testator; but it must be clear to every one who critically examines the subject that, unless restricted, the expense of making provision for a general museum alone would absorb all the funds, and thus confine to a single object, and that principally local in its effects, the bequest intended for the increase and diffusion of knowledge generally among men.

If the duplicates now in possession of the Institution were to be distributed on the plan of demanding an equivalent of specimens in exchange, the returns would fill far more than the unoccupied space now in the Smithsonian building, and an additional edifice would be required, the cost of which would either diminish the original fund or absorb for years to come the accruing interest. It is evident, therefore, that unless the museum be restricted within definite limits, the active operations which have given so much reputation to the Institution, and made the name of Smithson as familiar as a household word in every part of the world, must ultimately cease. It has, therefore, been concluded to confine the special collections of the Institution to type specimens, illustrating the natural history of the American continent. Even the cost of the preservation of these will be more than can well be afforded from the income of the original bequest. Indeed the Institution could do much more service to the cause of natural history, were Congress to accept as a gift the Smithsonian building and all its specimens for the purpose of establishing a separate museum, and suffer the Smithsonian income, thus freed from the expense of supporting so costly an establishment, to be entirely devoted to the active operations of the programme of organization.

It is not intended by the foregoing to decline accepting foreign specimens in cases in which they may be required for special investigation and comparison; on the contrary, it is a part of the policy of the Institution to furnish, as far as possible, to original investigators aid of this kind.

For an account of the labors connected with the collections and the museum, in detail, I must refer to the communication, herewith appended, of Professor Baird.

Exchanges.—The system of exchange still continues to perform an important part in the literary and scientific intercourse between this country and other parts of the world. During the year 1860 it has increased more rapidly than in any other period of the same length, and is now the principal medium of literary and scientific communication between the American continent and foreign countries. It is not confined on this side of the Atlantic to the United States, but extends to Canada, the West Indies, and South America.

As a natural consequence of the extension of this part of the operations, the cost of carrying it on has correspondingly increased, and it will be impossible with the limited income of the Smithsonian fund to enlarge the system, or even to continue it in its present dimensions,

without a *pro rata* assessment of at least a portion of the expenses on the different parties who avail themselves of its facilities. The expense of the system of exchange would, however, be far greater were it not for the many favors we receive from transportation companies, either in a great reduction of charges or their entire omission. For conspicuous examples of this liberality, the Institution may refer to the Cunard steamers between New York and Liverpool, to the North German Lloyd between New York and Bremen, the Pacific Mail Steamship Company, Panama Railroad Company, North Atlantic Steamship Company, the Adams Express Company, the steamship Isabel line between Charleston and Havana, and Russell's army transportation lines, and also to the Hudson's Bay Company.

The whole number of large packages containing books, specimens, and other articles received at the Institution from different parts of the world during 1860, was 1,000; the number of packages of the same character sent off was 888. When it is recollected that each of these packages contained a large number of articles, all of which were to be distributed, while those intended for this Institution were to be catalogued and acknowledged, some idea may be formed of the labor required to carry on this single branch of the general operations of the establishment. For a detailed statement of the particulars relative to this branch of the general operations, I must also refer to the report of Professor Baird.

Library.—Since the presentation of the last report, the plan adopted in regard to the increase of the library has been steadily pursued, namely: to obtain as perfect a series as possible of the transactions and proceedings of all the learned societies which now exist or have existed in different parts of the world. The distribution of the catalogue of the works of this kind already in the library, which was mentioned in the last report, with the request that our deficiencies might be supplied, has called forth the presentation of a large number of scarce volumes, intended to complete the sets, as well as to increase the number of our series. During the last year the Institution has received from abroad, for its own library, by way of donation and exchange, upwards of 5,000 presentations, consisting principally of volumes and parts of volumes.

The distribution of the same catalogue through this country has served to render more generally known the works contained in the library of the Institution, and has consequently increased its use. The value of this library will, however, be greatly enhanced by the

publication of the classified index of all papers contained in the transactions of learned societies and in scientific serials, now in process of preparation at the expense and under the direction of the Royal Society of London. The following extract from a letter lately received from General Sabine gives an account of the character and present condition of this work:

"Our plan comprehends natural history as well as what are usually called the exact sciences. It is intended to form three distinct catalogues: first, a catalogue of all the serials included in the publication, with the contents of each in chronological order; second, a catalogue of all the separate memoirs in all the serials, alphabetically arranged according to the authors' names; third, a classified catalogue of the separate memoirs. The two last named catalogues to contain, in addition to serials, distinct scientific memoirs in the appendices to voyages, travels, &c. We have written in quadruplicate the titles of above 80,000 detached memoirs, all from works (serials) in our own library. We have still in the library more serials, which will give us about 80,000 more titles, which we expect will be the work of the next fifteen or sixteen months. In the mean time we are seeking out for, and adding to, our library, works of the same nature which we do not possess. In this we think you could greatly assist us by lists of American publications—serials of course."

The Institution should contribute in every way in its power to this important work, and should endeavor, when it is printed, to make arrangements by which copies may be obtained at a small expense for the principal libraries of the country. In the way of contributions of some importance to this great enterprise, we hope to be able, in a short time, to furnish the bibliography of North American mammals, birds, several orders of insects, shells, and plants; and to complete, at no distant period, the whole series relative to the natural history of this continent.

The first volume of the catalogue of zoölogical literature from 1750 to the present day, by J. Victor Carus, of Leipzic, mentioned in the last report, has been published; and we would commend it to the patronage of naturalists as the best compilation which has yet appeared of the titles systematically arranged of isolated papers on zoölogy published in American as well as foreign journals.

Among the special donations since the date of the last report, are 151 volumes from the Royal Library at Munich, and 193 from the University at Olmutz; 60 from the British Museum, 30 from the Royal Society of Amsterdam, 25 from the Royal Society of Upsala, 28 from the University of Utrecht, and 36 from the Royal Observatory at Vienna.

The donation from the Royal Library of Munich, mentioned above, is a part of a large invoice of rare and valuable works, including many incunabula, for presentation to different specified libraries in the United States, after this Institution should have made its selection.

The purchases have been chiefly in the way of completing such series of transactions as could not be obtained by exchange, and of works necessary to the investigations connected with the Institution, such as those on natural history, meteorology, &c.

About one third of the expenditure under the head of "cost of books," given in the report of the executive committee, is for binding—an item of expense which is every year increasing with the number of serials received through our exchanges; the current volumes of this kind being usually distributed in paper covers. Since the date of the last report, all the scientific pamphlets have been classified according to subjects, and placed in the hands of the binder.

The policy adopted in regard to the library, as we have said, is that of rendering it a special collection, as complete as possible in transactions, proceedings of learned societies, and other scientific serials; and since the space which can be devoted—without further extension of the building—to the increase of this and other collections is limited, it has been thought proper to present to the American Antiquarian Society a large accumulation of newspapers in exchange for works more immediately in accordance with the design of the Institution, and with one of the fundamental propositions of the programme of organization, viz: that of doing nothing with its funds which can be done equally well or better by other means. While the care of these ephemeral publications would be troublesome and expensive to the Smithsonian Institution, it forms a legitimate part of the duty of the Antiquarian Society, which has a considerable fund expressly devoted to the purpose. This disposition of the papers, many of which have been presented to the Institution, is not made on account of a want of proper appreciation of their value; on the contrary, we fully agree with the opinion expressed by Mr. Haven, the learned librarian of the Antiquarian Society, "that even partial series, when properly arranged, constitute a geographical and historical chart of public sentiment, and of social and political facts, in which sectional and denominational diversities, of whatever kind, are brought under a single view for examination and comparison." They have been presented to the Antiquarian Society that they may better subserve this object, and in the spirit of coöperation which characterizes the policy of the Institution.

Gallery of Art.—The large and valuable collection of paintings of Indian portraits and scenes of Indian life belonging to Mr. Stanley, and those of the Government, have continued to form an object of attraction and interest to the numerous visitors of the Institution. The large room in which these pictures are displayed has been furnished with cases to contain the specimens of Indian costume, implements of war, and other articles to illustrate Indian manners and customs, which the Institution has received as presents from different parties.

No application of late has been made to Congress for an appropriation to purchase the valuable collection of Indian portraits belonging to Mr. Stanley, although it is hoped that in a more favorable condition of the Treasury an appropriation for this purpose will be granted.

At the last session of the board a letter from Professor Secchi, of Rome, was read, stating that he had obtained permission for the Institution to procure casts or moulds of celebrated statues in the Vatican, but it was concluded that all operations in this line should be deferred until the completion of the large and elegant building now in process of construction by Mr. W. W. Corcoran, of this city, to be devoted by him to the exhibition of works of art. In accordance with the policy adopted by the Institution, it has been proposed to coöperate with Mr. Corcoran in his liberal and generous enterprise, and to lend the influence of the Institution in procuring specimens of art for his gallery.

A considerable number of valuable engravings have been added to the collection by donations from the King of Saxony, and a series of those previously in the possession of the Institution, have been framed and hung up in different parts of the building. The plaster figures received by the Institution from the Patent Office have been cleaned and repaired, and are now exhibited in the connecting range of the west wing. The Secretary of the Interior has sent to the Institution the large stone sarcophagus brought from Syria by Commodore Elliott. It is an interesting relic of Roman sculpture, and has been placed in the south entrance hall of the building. It is proper also to mention that the relatives of the late Professor Espy have presented a half length portrait of him, which is at present placed in the library.

Lectures.—In accordance with the programme of the Institution, the following courses of lectures have been given to the citizens and visitors of Washington, during the winter of 1860–61, namely:

Five lectures by Professor FAIRMAN ROGERS, of the University of Pennsylvania, on Civil Engineering, Roads and Bridges, and the principles involved in their construction.

One lecture, by Professor P. A. CHADBOURNE, of Williams College, on Iceland.

Five lectures by Dr. F. A. P. BARNARD, President of the University of Mississippi, on polarized light.

1. Outline of optical discovery; characteristics of polarized light.
2. Undulatory theory of light; physical doctrine of polarization.
3. Chromatics of polarized light.
4. Physical theory of double refraction, and of polarization by double refraction.
5. Circular, elliptical, and rotary polarization.

Two lectures by Professor STEPHEN ALEXANDER, of the College of New Jersey, on solar eclipses and their attendant phenomena, with a particular account of the total eclipse of last July, and the observations made in connection with it by the Government expeditions to Labrador, the Pacific coast, and elsewhere.

Three lectures by S. WELLS WILLIAMS, on China and Japan.

1. The literature and government of China.
2. The civilization of the Chinese.
3. Rank of the Japanese among Asiatic nations.

Five lectures by Rev. JOHN LORD, of Connecticut, on the great representatives of modern civilization, &c.

1. Michael Angelo and art.
2. Bacon and philosophy.
3. Cromwell and liberty.
4. Madame De Stael and literature.
5. Columbus and discovery.

Beside the foregoing, a series of experimental lectures on physical science has been given by the Secretary of the Institution to the teachers of the District, and others interested in the subject. In these articles of apparatus presented by Dr. Hare, and those purchased for the use of the Institution, were used. During the present lecture season, owing perhaps, in part, to unfavorable weather and the distracted condition of the public mind, the attendance has been less numerous than in former years. The plan suggested in the last report, of closing the doors after the lecture had commenced, has been adopted and found conducive of good order and more prompt attendance.

Respectfully submitted,

JOSEPH HENRY,
Secretary Smithsonian Institution.

FEBRUARY, 1861.

APPENDIX TO THE REPORT OF THE SECRETARY.

SMITHSONIAN INSTITUTION,
Washington, December 31, 1860.

SIR: I have the honor herewith to present a report for 1860 of the operations you have intrusted to my charge, namely: those which relate to the printing, the exchanges, and to the collections of natural history.

Very respectfully, your obedient servant,

SPENCER F. BAIRD,
Assistant Secretary Smithsonian Institution.

Prof. JOSEPH HENRY, L.L. D.,
Secretary Smithsonian Institution.

PRINTING.

The publications of the Institution printed during the year 1860 consisted of 614 quarto and 644 octavo pages, illustrated by seven plates and sixty-six wood cuts.

EXCHANGES AND TRANSPORTATION.

During the year 1860 there has been a very great extension of all operations connected with the department of exchanges. The receipts by the Smithsonian Institution have been much enlarged over those of any previous year, and an increased use has been made by other parties of its facilities both for the transmission and return of packages.

The following tables will be found to exhibit the statistics of this branch of operations of the Smithsonian Institution, showing how important a part it plays in aiding the scientific and literary intercourse of different parts of the globe.

The expense of the system of exchanges, however, has been correspondingly increased, and would have been greater than the Smithsonian income could defray without the many favors from transportation companies, in the way of material reduction or entire remission of charges

for freights. The benefits resulting from such liberality have of course been experienced by all departments of operations, but chiefly in that of exchanges and of the collections. The parties to which the Institution is chiefly indebted are as follows:

The North German Lloyd, a line of steamships between New York and Bremen, of which Messrs. Gelpcke, Keutgen, and Reichelt, of New York, are agents. The Pacific Mail Steamship Company, between San Francisco and various ports of Oregon and Washington, to the north, and Panama to the south; of which Mr. W. O. Davidge was president for a time—succeeded by Mr. Allen McLane. Also, the Panama Railroad Company, Mr. David Hoadley, President. The steamer connection with California was, at the date of the last report, formed by the North Atlantic Steamship Company, Mr. I. W. Raymond, President; and the Institution had the privilege of transmitting its exchanges both ways free of charge. Since the new arrangements, by which the vessels of Commodore Vanderbilt replace those of the last mentioned company, this privilege has been somewhat interrupted; the agent of Commodore Vanderbilt declining to continue it between New York and Aspinwall. I am, however, happy to report that no serious interruption beyond a little delay has resulted, as Mr. Hoadley has authorized the free transmission of Smithsonian parcels by the brig line of the Panama railroad between New York and Aspinwall.

To Mr. A. B. Forbes, agent of the Pacific Mail Steamship Company, in San Francisco, aided by Mr. Samuel Hubbard, the Institution is under many obligations, in acting as general agents for it in California.

The great facilities authorized by the Adams Express Company, through Superintendent S. M. Shoemaker, and at present exercised by the Washington agent, Mr. McLaughlin, mentioned in the last report, have been continued the past year, greatly to the interest of the Institution.

The Cunard steamers, between New York and Liverpool, have carried many packages free of charge during the year.

In addition to the parties first mentioned, assistance has been rendered, as heretofore, to the exchanges and explorations conducted by the Institution, by the steamer Isabel, running between Charleston and Havana; by Mr. W. H. Russell, army contractor of transportation, and by other parties.

The services of the parties named above have all been gratefully mentioned in preceding reports. To the directors and officers generally of the honorable Hudson's Bay Company, through the late Sir George Simpson, governor in this country, the Smithsonian Institution has to acknowledge its special indebtedness. In addition to the aid afforded to the various enterprises of Hudson's Bay explorations on the part of the Institution, referred to elsewhere, it has carried a very large amount of freight in its canoes, free of charge, consisting of supplies to various points, and returns of meteorological records and specimens of natural history. Without such assistance the expense of conducting scientific explorations in the far north would be so great as entirely to preclude the possibility of any such enterprises on the part of the Institution.

The entire number of packages received at the Institution during 1860, by express, railroad, and steamboat, amounted to exactly 1,000; while 888 were transmitted in the same time; making an aggregate of 1,888. This number, of course, has no reference to the sub-packages or smaller parcels inclosed in larger ones, or in the boxes of exchanges received from the agents of the Institution abroad. The receipts of the same kind in 1859 were 804; the transmissions 845; an aggregate of 1,649, showing an increase of 239, or about one seventh.

A.

Receipt of books, &c., by exchange in 1860.

Volumes:		
Octavo		781
Quarto		419
Folio		71
		1,271
Parts of volumes and pamphlets:		
Octavo	2,716	
Quarto	1,371	
Folio	93	
		4,180
Maps and charts		220
Total		5,671

Showing the very great increase over the aggregate (3,602) of last year, of 2,069 volumes and parts of volumes, or nearly as great an amount as the receipts of 1858 and 1859 combined. The number of separate donations was 1,635, to 1,252 of last year.

As a matter of some interest I take the liberty of recapitulating the receipts by exchange in the ten years, during which the system has been in active operation:

1851	878	volumes and parts of volumes.
1852	609	do.
1853	2,556	do.
1854	2,828	do.
1855	2,770	do.
1856	3,330	do.
1857	1,760	do.
1858	2,540	do.
1859	3,602	do.
1860	5,671	do.
Total	26,544	do.

B.

Table showing the statistics of the foreign exchanges of the Smithsonian Institution in 1860.

Agent and country.	Number of addresses.	Number of packages.	Number of boxes.	Bulk of boxes in cubic feet.	Weight of boxes in pounds.
1. Dr. Felix Flugel, *Leipsic.*					
Sweden	11	31	.....	.....	.....
Norway	6	18	.....	.....	.....
Denmark	9	32	.....	.....	.....
Russia	27	80	.....	.....	.....
Holland	18	63	.....	.....	.....
Germany	164	530	.....	.....	.....
Switzerland	16	56	.....	.....	.....
Belgium	8	25	.....	.....	.....
Total	259	835	21	274	6,841
2. H. Bossange, *Paris.*					
France	72	195	.....	.....	.....
Italy	32	96	.....	.....	.....
Portugal	2	5	.....	.....	.....
Spain	5	1	.....	.....	.....
Total	111	307	13	174	4,561
3. Henry Stevens, *London.* Great Britain and Ireland	105	430	22	299	8,327
4. *Rest of the world*	50	120	5	20	300
Grand total	525	1,692	61	767	20,029

C.

Packages received by the Smithsonian Institution from parties in America for foreign distribution in 1860.

	No. of packages.
Albany, N. Y.—	
Prof. J. Hall	9
New York State Agricultural Society	16
Baltimore, Md.—	
Dr. P. R. Tyson	50
Boston, Mass.—	
American Academy of Arts and Sciences	78
Society of Natural History	48
F. H. Storer	169
Messrs. Storer and Elliott	78

	No. of packages.
Cambridge, Mass.—	
American Association for Advancement of Science	38
Observatory	8
Prof. Asa Gray	19
Columbus, Ohio.—	
State Agricultural Society	100
W. S. Sullivant	15
Danville, Ky.—	
Institution for Deaf and Dumb	10
Frankfort, Ky.—	
State of Kentucky	150
Montreal, Canada.—	
T. S. Hunt	12
New Haven, Conn.—	
American Journal of Science	12
American Oriental Society	8
Yale College	5
Philadelphia, Penn.—	
Academy of Natural Sciences	131
American Philosophical Society	250
Historical Society of Pennsylvania	13
Isaac Lea	73
Dr. S. W. Mitchell	6
Providence, R. I.—	
State of Rhode Island	6
San Francisco, Cal.—	
California Academy of Science	17
Toronto, Canada.—	
Canadian Institute	11
Washington, D. C.—	
United States Patent Office	1,391
United States Coast Survey	185
Surgeon General	100
Lieut. Warren, U. S. A	6
Lieut. J. C. Ives, U. S. A	10
Williamsburg, Va.—	
Eastern State Lunatic Asylum	12
Miscellaneous	94
	3,130

D.

Addressed packages received by the Smithsonian Institution from Europe, for distribution in America, in 1860.

	Number of packages.
Albany, N. Y.	
Dudley Observatory	7
New York State Library	8
New York State Agricultural Society	17
New York State Medical Society	
Prof. James Hall	9
Albany Institute	2
Dr. Brunnow	6
Prof. E. Emmons	1
J. H. Hickcox	2
Prof. Peters	1
H. W. Schroeder	1
Amherst, Mass.	
Amherst College	6
Prof. Hitchcock	3
Edward Tuckerman	1
Annapolis, Md.	
Naval Academy	2
Ann Arbor, Mich.	
Observatory	4
University of Michigan	1
Prof. Brunnow	1
Atlanta, Ga.	
Atlanta Medical and Surgical Journal	2
Bahia, Brazil.	
Dr. Fölsner, (Hann. Consul)	1
Baltimore, Md.	
Maryland Historical Society	6
Rev. Dr. J. G. Morris	2
Bogota, New Granada.	
Societa de Naturalistas Neo-Granadinos	2
Bethlehem, Penn.	
Rev. Mr. Seidel	1

	Number of packages.
Boston, Mass.	
American Academy of Arts and Sciences	74
Boston Society of Natural History	55
Historic-Genealogical Society	3
Prison Discipline Society	1
Dr. A. A. Gould	3
American Statistical Association	6
Bowditch Library	7
Geological Survey	1
Philosophical Society	1
Library of Boston Athenæum	1
Lyceum of Natural History	2
Massachusetts Historical Society	3
Massachusetts State Library	6
Public Library	9
Francis Alger	1
Dr. S. L. Abbott	1
Prof. J. W. Bailey	1
Edward Habich	1
Prof. Jackson	1
Charles C. Jewett	1
Prof. Jules Marcou	1
Prof. Moreland and F. Minot	2
Profs. W. B. and H. D. Rogers	4
Samuel H. Scudder	1
Brunswick, Me.	
Bowdoin College	5
Historical Society of Maine	2
Mr. Packard	2
Burlington, Iowa.	
Iowa Historical and Geological Institute	2
Burlington, Vt.	
University of Vermont	3
George P. Marsh	1
Cambridge, Mass.	
American Association for Advancement of Science	20
Astronomical Journal	7
Cambridge Observatory	16
Prof. L. Agassiz	41
Prof. Asa Gray	17
Harvard University	22
G. P. Bond	5
James P. Cooke	1

D—Continued.

	Number of packages.
Cambridge, Mass.—Continued.	
Charles H. Davis	1
Dr. B. A. Gould	15
Joseph Lovering	3
Prof. Pierce	6
S. H. Safford	1
J. E. Worcester	4
Prof. Jeffries Wyman	2
Cave Spring, Ga.	
Institution for Deaf and Dumb	1
Charleston, S. C.	
Society Library	3
Dr. Bachman	1
Dr. J. M. Geddings	1
Prof. Francis S. Holmes	1
Prof. John E. Holbrook	1
Dr. C. Happoldt	2
Rev. Thomas Smyth	1
Elliott Society of Natural History	16
Chapel Hill, N. C.	
University of North Carolina	1
Charlottesville, Va.	
University of Virginia	4
Chicago, Ill.	
Illinois University	1
Chicago Medical Journal	2
Mechanics' Institute	3
Col. J. D. Graham	6
M. C. Herrenkind	1
Chuquisaca, Bolivia.	
University of Chuquisaca	2
Cincinnati, Ohio.	
American Medical Journal	2
Historical and Philos'l Society of Ohio.	2
Mercantile Library	3
Observatory	3
Public Library of Cincinnati	1
John G. Anthony	1
Prof. Mitchell	2
Dr. Newton	1
Cleveland, Ohio.	
Dr. J. S. Newberry	2
Clinton, N. Y.	
Dr. C. H. Peters	1
Columbus, Ohio.	
Ohio State Agricultural Society	42
John H. Klippart	1
Columbia, S. C.	
South Carolina College	3
State University Geological Rooms	2
Robert W. Gibbes	1
Concord, N. H.	
New Hampshire Historical Society	2
Cannellton, Ind.	
Hon. Ballard Smith	1
Davenport, Iowa.	
Rt. Rev. Henry W. Lee	1
David Sheldon	1
Des Moines, Iowa.	
State of Iowa	3
Detroit, Mich.	
Michigan State Agricultural Society	26
Penin. and Independent Medical Journal.	4
J. C. Holmes	1
Dorchester, Mass.	
Dr. E. Jarvis	2
East Greenwich, N. Y.	
Asa Fitch	1
Easton, Pa.	
Breckenridge Clemens	1
Evansville, Ind.	
Hermann Flügel	1
Frankfort, Ky.	
Geological Survey of Kentucky	5
Gambier, Ohio.	
Kenyon College	2
Georgetown, D. C.	
Georgetown College	16

D—Continued.

	Number of packages.
Hartford, Conn.	
Historical Society of Connecticut	2
Society of Physical Science	1
Young Men's Institute	2
Hanover, N. H.	
Dartmouth College	8
Havana, Cuba.	
Observ. Phys. Meteorol. de la Havana.	2
Hudson, Ohio.	
Western Reserve Observatory	1
Indianapolis, Ind.	
Indiana Historical Society	2
Institution for Deaf and Dumb	1
Iowa City, Iowa.	
State University	30
Jefferson, Mo.	
Historical and Philosophical Society of Missouri	2
Lansing, Mich.	
Michigan Agricultural Society	1
Lebanon, Tenn.	
James M. Safford	1
Lexington, Ky.	
Transylvania University	1
Little Rock, Ark.	
Governor of Arkansas	1
Arkansas State Institute	1
State of Arkansas	11
University of Arkansas	3
Long Island, N. Y.	
Dr. Louis Bauer	1
Louisville, Ky.	
Historical Society	2
Col. Long	1
Prof. J. Lawrence Smith	1
Madison, Wis.	
Educational Society of Wisconsin	1
Hon. Henry Barnard	1
A. C. Ingham	1
Society for Education of Blind	2
Wisconsin State Agricultural Society	37
Historical Society of Wisconsin	7
Montreal, Canada.	
Natural History Society	1
College of Montreal	1
T. Sterry Hunt	1
Dr. Kingston	1
Sir William E. Logan	1
McConnellsville, Ohio.	
Hon. Elijah Hayward	1
Milledgeville, Ga.	
Oglethorpe University	4
Professor James Woodrow	1
Montpelier, Vt.	
Historical and Antiquarian Society of Vermont	2
Nantucket, Mass.	
Miss Mitchell	2
Nashville, Tenn.	
University of Nashville	1
Natchez, Miss.	
Public Library	1
Newark, N. J.	
Historical Society of New Jersey	3
New Brunswick, N. J.	
Prof. George H. Cook	7
New Harmony, Ind.	
Dr. D. D. Owen	5
New Haven, Conn.	
American Journal of Science	20
American Oriental Society	12
W. P. Blake	4
Prof. J. D. Dana	30

D—Continued.

	Number of packages.
New Haven, Conn.—Continued.	
Yale College	11
George J. Brush	2
Daniel C. Eaton	1
Samuel W. Johnson	1
Prof. E. Loomis	8
Lieut. Olmstead	2
Prof. Charles U. Shephard	1
Prof. Silliman	25
Prof. W. D. Whitney	3
New Orleans, La.	
New Orleans Academy of Natural Sciences	23
Lyceum of Natural History	1
University of Louisiana	1
Dr. Bennet Dowler	2
Newport, R. I.	
Redwood Library	1
Newton Centre, Mass.	
Horatio B. Hackett	1
New York, N. Y.	
American Geographical and Statistical Society	40
New York Lyceum of Natural History	38
American Ethnological Society	8
American Bible Society	1
American Institute	8
American Agricultural Intelligencer	1
Astor Library	1
Editor of the State's Zeitung	1
Farmers' and Mechanics' Intelligencer	1
Historical Society	1
Mercantile Library Association	3
Norton's Literary Gazette	2
University Library	7
Philosophical Society	1
Prof. Clarke	1
Daniel C. Eaton	1
Prof. Wolcott Gibbs	2
Henry Grinnell	4
M. Harlan	3
Dr. John C. Jay	2
Dr. Charles A. Joy	1
Charles Loosey (Consul Gen'l, Austria)	4
Temple Prime	1
John Lothrop Motley	1
James Renwick	1
Mr. Sullivan	1
Dr. John Torrey	5
Mr. Tuckerman	1
Oxford, Penn.	
Dr. E. Pfeiffer	1
Philadelphia, Penn.	
Academy of Natural Sciences	99
American Philosophical Society	64
Central High School	2
Historical Society of Pennsylvania	3
Philadelphia Library Company	4
W. G. Binney	1
Isaac Lea	17
Dr. John L. Leconte	4
Dr. Joseph Leidy	19
Franklin Institute	9
Geological Society	2
Geological Survey	4
Loganian Library	1
North American Medical and Surgical Review	2
Wagner Free Institute	8
T. A. Conrad	1
Lorin Blodget	2
Prof. F. A. Genth	1
S. S. Haldeman	1
J. P. Lesley	1
Chester Morris	1
Richard Narlan	1
William Sharswood	7
H. S. Tanner	2
Prof. Wagner	1
Portland, Me.	
Neal Dow, Mayor of Portland	1
Porto Cabello, Venezuela.	
Franklin Litchfield, late United States consul	1
Princeton, N. J.	
College of New Jersey	3
Providence, R. I.	
Brown University	4
Rhode Island Historical Society	1
Quebec, Canada.	
Legislative Library of Canada	1
Richmond, Va.	
Historical Society of Virginia	2
Virginia State Library	1
Rochester, N. Y.	
University Library	1

D—Continued.

	Number of packages.
Rock Island, Ill.	
B. D. Walsh	1
Rio Janeiro, Brazil.	
Inst. Hist. Geogr. of Brazil	2
Herr Rieder	1
Roxbury, Mass.	
Dr. Reinhold Sölger	1
Salem, Mass.	
Essex Institute	2
Prof. F. L. Russell	1
Santiago, Chili.	
Institute de Santiago	1
Observatory	6
University	10
Prof. Ignacio Domeyko	1
Dr. Landhecth	2
Prof. Lobeck	1
Prof. R. A. Philippi	1
Savannah, Ga.	
Georgia Historical Society	2
St. Paul, Minn.	
Historical Society of St. Paul	2
San Francisco, Cal.	
California Academy of Natural Sciences.	20
Dr. W. O. Ayres	1
St. Louis, Mo.	
St. Louis Academy of Sciences	85
Dr. George Engelmann	9
Dr. Wizlicenus	.....
Deutsche Inst. für Bef. im Wiss. Kunst. un Gew	9
Geological Survey of Missouri, (Columbia, Mo.)	7
St. Louis Medical and Surgical Journal.	2
University Library	2
E. C. Angelrodt	1
George Bemays	1
Dr. Adam Hammer	1
N. Holmes	1
Dr. Albert Koch	2
Dr. B. F. Shumard	10
Prof. G. C. Swallow	1
Springfield, Ill.	
Prof. Esbjörn	1
Springfield, Mass.	
William Tully	2
Toronto, C. W.	
Canadian Institute	6
Board of Agriculture, Upper Canada	1
Trinity College	2
Prof. Kingston	1
Tripoli.	
Daniel Smith McCauley, late United States consul	1
Tuscaloosa, Ala.	
University of Alabama	2
Utica, N. Y.	
American Journal of Insanity	5
Valdivia, Chili.	
Dr. Eugen Von Bock	1
Vandalia, Ill.	
Historical Society of Illinois	1
Valparaiso, Chili.	
Dr. Thomas A. Reid	8
Washington, D. C.	
United States Patent Office	87
Ordnance Bureau	2
United States Coast Survey	12
National Observatory	32
Secretary of War	2
Surgeon General	1
Lieutenant J. M. Gilliss, U. S. N.	36
William Stimpson	5
F. B. Meek, and Dr. F. V. Hayden	2
Congress Library	6
His Excellency James Buchanan	1
Commissioner of Indian Affairs	1
Commissioner of Patents	5
Secretary of State	1
Superintendent of Statistical Office	1
National Institute	3
Trigonometrical Survey	1
United States Agricultural Society	1
War Department	1
Colonel Abert	2
Prof. S. F. Baird	2
Prof. A. D. Bache	46
Major Emory	1

D—Continued.

	Number of packages.		Number of packages.
Washington, D. C.—Continued.		*Waterville, Me.*	
Prof. Espy	2	Waterville College	2
A. Ferguson	3		
Hon. Peter Force	1	*West Chester, Penn.*	
Dr. C. Girard	3		
Captain H. J. Hartstene	5	W. Darlington	1
Baron de Gerolt	1		
Captain A. A. Humphreys	1	*West Point, N. Y.*	
Prof. S. S. Hubbard	1		
Prof. W. R. Johnson	2	Military Academy	1
Lieutenant S. P. Lee	1	Prof. Bartlett	3
Lieutenant M. F. Maury	48		
George W. Riggs	4	*Williamstown, Mass.*	
Baron Osten Sacken	1	Observatory	1
Charles A. Schott	1		
H. R. Schoolcraft	4	*Worcester, Mass*	
J. C. G. Kennedy	1		
John Xantus	1	American Antiquarian Society	9

Total of addresses	335
Total of parcels	1,908

By a comparison with the last report, it will be seen that the total number of parcels received for other parties in 1860, is about the same as in 1859. Their bulk, however, is much greater, owing to the consolidation by the agents of the Institution, and by societies, of several parcels to the same address into one package before transmission, as advised by the Institution. The average number of parcels to each address is nearly six.

MUSEUM AND COLLECTIONS.

Additions to the Museum and Collections.—During the year 1860 important additions have been made to the collection of various species, chiefly North American, and serving to render it nearly complete as regards a large part of the fauna of the continent. Many new facts in regard to the geographical distribution of species over its whole extent, and their habits, have been obtained, while carefully prepared measurements, weighings, and other facts bearing on the physical constants of animals, as called for in Mr. Babbage's article in the Smithsonian Report for 1856, have been accumulated in great numbers in the labels and catalogues accompanying the specimens.

The great bulk of material received has consisted of specimens deposited by the officers in charge of Government expeditions pursuant to the act of Congress in relation to the subject. Next to these, of collections made in equally or still more unexplored regions of North America at the instance, or through the instrumentality, of this Institution, and involving not merely the addition of specimens, but accom-

panied by most important results in physical science. Comparatively nothing has been received from the more known portions of the United States; the transmission of fishes, reptiles, &c., having almost entirely ceased. This is due to the fact that no effort has been made to secure such specimens, on account of the comparative completeness of the series, and the expense of enlarging them. There is already a large accumulation of such material in the Institution, which, however, the systematic arrangement for distribution of labeled duplicates now in progress will speedily and greatly deplete.

The only departments of natural history to which additions have been made from all parts of the United States, have been those of conchology, entomology, and öology. Circulars were issued in 1859 and 1860 inviting contributions of material towards a series of works on these subjects which the Institution had in contemplation, to be written by the most competent authorities. The invitation has been generally responded to by the transmission of many parcels, (many of them containing types of rare species.) These have been placed in the hands of the collaborators of the Institution as received, and have proved of great importance.

The following is a detailed statement of the most important collections received in 1860:

FROM EXPLORATIONS UNDER THE WAR DEPARTMENT.

Construction of Wagon Road from Walla-Walla to Fort Benton, under Lieutenant John Mullan, U. S. A.—The work of this expedition was carried out to Fort Benton during the past season, so as to render the road passable throughout. Large collections, chiefly of fossils, birds, and plants, were made by Mr. John Pearsall and Mr. Hildreth, attachés of the party.

Exploration of the Upper Missouri and Yellowstone, under Captain W. F. Raynolds, U. S. A.—After spending the winter at Deer Creek, on the Platte, west of Fort Laramie, explorations were resumed by the expedition in May. Dividing into two parties—one commanded by Captain Raynolds, and accompanied by Dr. Hayden; the other by Lieutenant Maynadier, with Mr. George H. Trook as collector—they proceeded to explore the Wind River mountains, and other localities between the Platte and the Upper Missouri, as far north as Fort Benton. Finishing their labors during the summer, both parties united at Fort Randall, and returned to Washington in November.

Many important collections were made by the expedition, of fossils, plants, and zoölogical specimens. In the Wind River mountains especially, specimens were obtained of great interest, among them what is believed to be a new species of Alpine hare.

Movement of United States Troops to Oregon, via Fort Benton, under Major G. H. Blake, U. S. A.—This party was accompanied by Dr. J. G. Cooper as one of its medical officers, who made some valuable collections of specimens, serving to extend the information respecting the species inhabiting Oregon and Washington, as recorded in the re-

port on the subject made to Governor Stevens by Dr. Cooper and Dr. Suckley.

Artesian Well Expedition, under Captain J. Pope, U. S. A.—The remainder of the collections of this party, consisting principally of specimens in alcohol, have been received from Captain Pope.

FROM EXPLORATIONS UNDER THE STATE DEPARTMENT.

Survey of the Northwestern Boundary, Archibald Campbell, Commissioner.—This commission nearly completed its work during the year, and is now on its return home. Large collections in geology and natural history have been made by Dr. Kennerly and Mr. George Gibbs, in continuation and completion of those previously reported on.

FROM EXPLORATIONS UNDER THE INTERIOR DEPARTMENT.

Survey of the Northern Boundary of Texas, J. H. Clark, Commissioner.—In addition to other specimens, a very complete collection of nests and eggs of birds was made during the past spring along the line of this survey by Mr. Charles S. McCarthy, including several species previously unknown to science.

FROM EXPLORATIONS UNDER THE NAVY DEPARTMENT.

Exploration of the Parana and its tributaries, under Capt. T. J. Page, United States Navy.—This expedition completed its important work during the year 1860, and has returned to the United States. In addition to its geographical and hydrographical labors, much attention was paid to natural history; and among the large collections brought home are many new and rare species. The birds of the country visited are especially interesting; the series, prepared chiefly by Mr. Christopher Wood, being perhaps the largest ever made in that region.

FROM EXPLORATIONS MORE SPECIALLY CONNECTED WITH THE SMITHSONIAN INSTITUTION.

Exploration of Cape St. Lucas, by Mr. John Xantus.—In the last report reference was made to an exploration of Cape St. Lucas, the southern extremity of the Peninsula of Lower California, by Mr. John Xantus, tidal observer of the United States Coast Survey. This exploration, so far as the natural history results are concerned, may be considered as completed; as, although many isolated species may yet remain uncollected, the general peculiarities of its fauna and flora are now well ascertained. Besides the addition of a larger number of new animals to our fauna than has been made by one person in any single region of North America before, Mr. Xantus has shown that the most interesting relationship exists between the land species of the Cape and those of the region of the Gila, Upper Rio Grande, and the southern Rocky Mountains. On the other hand, very few of the characteristic species of the coast of Upper California occur at the Cape; while, as far as observed, the same may be said of the strictly Mexican types.

The entire Peninsula thus proves to be as specially related to North America in its land fauna as is Florida, although the number of peculiar species is much greater.

The marine fauna of Cape St. Lucas proves to be quite Panamic in its general features—much more so than the opposite coast of Mexico.

It is out of my power, at present, to present a statement of the number of species collected by Mr. Xantus during his residence (when last heard from) of about eighteen months. There are, however, known to be about twenty new birds, as many reptiles, large numbers of fishes, crustaceans, and other groups in proportion. The collection of shells is much larger than any ever made on the west coast, with the exception of that by Mr. Reigen, forming the basis of the report on Mazatlan shells, by Mr. Carpenter, and is superior to any other in the extent of the species preserved entire in alcohol. The general results form a fitting continuation of the labors of Mr. Xantus at Fort Tejon, referred to in preceding reports; and the whole will form an extraordinary monument of the ability of a single intelligent and accomplished collector to nearly exhaust the natural history of an extensive region, under difficulties sometimes apparently almost insuperable.

To the Superintendent of the Coast Survey, natural science must ever acknowledge a great indebtedness for placing Mr. Xantus in a position to make his explorations, by authorizing and establishing a self-registering tide-gauge station at the Cape, and placing Mr. Xantus in charge. All his collections were made in the intervals of his duty as observer upon the tides, meteorology, &c., for the Coast Survey.

Explorations in the Gulf of California, by Capt. Stone.—Capt. Stone, in charge of the survey of Sonora, caused numerous collections to be made in the northern part of the Gulf, chiefly opposite Guayamas. Of these a portion, consisting principally of shells, have been received during the year, and prove to be of much interest, not only in themselves, but as completing the history of Cape St. Lucas and Mazatlan species.

Exploration of the vicinity of Fort Crook, by Mr. John Feilner.—Mr. Feilner, sergeant of company F., first dragoons, stationed at Fort Crook, under command of Captain John Adams, United States Army, has considerably extended the collections referred to in the last report. In May last, by permission of Captain Adams, he visited the lake region to the north of Fort Crook, with one companion, with the view of pursuing his researches among the breeding places of the water birds of California. After meeting with much success, he was attacked by hostile Indians, but succeeded in fighting his way through, killing several of his assailants, and, unfortunately, with the loss of a considerable proportion of his collections. His gallantry, and that of his companion, Private Guise, have been made the subject of especial commendation in a general order from the War Department.

Dr. Vollum, United States Army, surgeon of Fort Crook, has also made various collections for the Institution; and Hospital Steward Par-

kinson has transmitted others not yet received; so that this fort bids fair to be as well marked for an almost perfect knowledge of its natural history as Fort Tejon through the labors of Mr. Xantus. A comparison of collections from these two points in the same range of mountains, dividing the Pacific and middle faunas, and about 500 miles apart, has proved of scientific interest in determining the geographical distribution and variation of the species of California animals, many of the facts elicited being quite unexpected.

Exploration of other points on the West Coast.—Dr. C. A. Canfield, of Monterey, has gathered additional materials for illustrating the natural history of his vicinity. Rev. Jos. Rowell and Dr. W. O. Ayres have furnished important collections of shells for Mr. Carpenter's use, in his proposed elaboration of the conchology of western America. Mr. J. G. Swan, of Washington Territory, has also contributed largely to the same object. Specimens of birds and eggs have been received from Mr. Hepburn, of San Francisco, and Mr. Ferdinand Gruber; and of Californian coniferae, from Mr. Wm. Murray.

Exploration of the Hudson's Bay territory, by Mr. Robt. Kennicott.—In the last report reference was made to the exploration of the Hudson's Bay country by Mr. Robt. Kennicott. Since that report was written, advices have been received from him up to July, 1860. He had reached Fort Simpson in September, and after a short excursion up the Liard river to Fort Liard, in the Rocky Mountains, returned to Simpson, where he spent the winter as the guest of Mr. B. R. Ross, the gentleman in charge of the Mackenzie River district. In the spring he went to Great Slave Lake for the purpose of collecting eggs; making Fort Resolution his headquarters, and meeting with great success.

For a most generous coöperation of the Hudson's Bay Company, through Sir George Simpson, and its officers in England and America, the Institution is under the greatest obligations. Every possible facility has been furnished to Mr. Kennicott, not only in permission to visit the different posts, but in the way of free transportation of himself and his collections, quarters at the posts, &c. Wherever he has gone he has found an appreciation of his mission and a readiness to assist, gratifying in the highest degree. Nearly all the gentlemen in charge of different posts have undertaken to make observations in meteorology for the Institution, (for which purpose Mr. Kennicott carried with him blank registers, thermometers, &c.,) as well as collections of such objects of natural history as he might not succeed in securing himself.

The gentlemen to whom Mr. Kennicott expresses his indebtedness most particularly, after Mr. Ross, are Mr. L. Clarke, Mr. J. Reid, Mr. A. McKenzie, Mr. MacFarlane, and Mr. Hardisty.

To Mr. B. R. Ross, chief trader, in charge of the Mackenzie River district, the Institution is under great obligations, not only for protectection and assistance to Mr. Kennicott, which his official position so well enabled him to furnish, but for a special contribution of his own. In coöperation with the officers of the posts in his district, he has undertaken and already, to some extent, realized a special exploration of his district, entirely independent of that of Mr. Kennicott. Full observations upon the climatology, periodical phenomena, and other

features of the country, will be made, with collections illustrating its natural history, ethnology, &c., and transmitted to the Institution. A large amount of material has already been received from him and his coadjutors in the way of meteorology and natural history. Among the more important animals are skins of the Rocky Mountain goat, Arctic reindeer, Barren Ground bear, Hare-Indian dog, &c.; skeletons of goat, reindeer, wolverene, skins of various fishes, as *Thymallus*, *Salmo Mackenzii*, &c.; Esquimaux and Indian curiosities, with many other objects of equal interest.

Mr. W. Mactavish, chief factor, resident at Fort Garry, has laid the Institution under special obligations by his assistance in the transmission of supplies to and reception of collections from Mr. Kennicott, as well as himself procuring specimens from different points and forwarding to Washington.

Mr. Kennicott intended to return to Fort Simpson in August, and to proceed down the Mackenzie to Fort Good Hope; thence across the Rocky Mountains to Fort Yukon, on the Yukon river, a post in the interior of Russian-America. There, in a region almost entirely unknown, not merely in its natural history, but its very geography, he expects to remain until next summer, then to proceed to some other desirable center of operations.

It will be remembered that while the chief expenses of Mr. Kennicott's operations are sustained by this Institution, very important assistance has been received from the University of Michigan, the Chicago Audubon Club, and the Chicago Academy of Natural Sciences, together with several gentlemen interested in natural history. Without the facilities furnished by the Hudson's Bay Company and its officers, however, the enterprise, in its present extent, would be entirely impracticable.

Mr. George Barnston, of Michipicoten, Lake Superior, to whom Mr. Kennicott was much indebted for the favorable direction of his operations at the outset, has furnished many desirable additions to the collections of the Institution from the north shore of Lake Superior. Chief among these may be mentioned a skin of the reindeer in superb condition, and now mounted in the museum; also, a nearly complete skeleton of the same animal.

Exploration of James' Bay by Mr. C. Drexler.—Mr. C. Drexler visited James' Bay, the southern extremity of Hudson's Bay, in May last, and remained until September. He reached Moose Factory the end of May, and after a few days, proceeded in a canoe, with some Indians, as far along the east coast as Fort George, where he remained some time. He was chiefly engaged in the collection of eggs of birds, though all other departments of natural history received his attention.

As in the case of Mr. Kennicott, the aid of the Hudson's Bay Company has been indispensable to the success of Mr. Drexler's enterprise. The facilities ordered by Sir George Simpson, and carried out by Mr. John McKenzie, at Moose Factory, with the coöperation of the gentlemen at the posts visited, enabled him, with the small means at his command, to accomplish results of great interest and magnitude. The collections made by Mr. Drexler were also taken from Moose Factory

to London, free of expense, in the ship belonging to the Hudson's Bay Company, and then transmitted to this country.

Beside the aid furnished by the Institution, it is proper to state that the chief portion of the funds used in meeting Mr. Drexler's expenses were supplied by Dr. Henry Bryant, of Boston.

Explorations on the Labrador Coast.—Mr. Elliot Coues, of Washington, visited the Labrador coast last spring, in the vessel chartered by Mr. John W. Dodge, and spent several months there, going as far north as Rigolette. His collection consisted chiefly of birds and eggs, of which several rare species were procured.

During the United States Coast Survey expedition to Cape Chadleigh, on the steamer Bibb, for the purpose of observing the total eclipse of the sun of July 18, a number of specimens were obtained by Mr. W. A. Henry, one of the party.

Explorations in the Gulf of St. Lawrence, by Dr. Henry Bryant.—Dr. Bryant chartered a vessel at Gaspé, and in it spent several months visiting various points in the Gulf and on the adjacent coasts. His researches were principally in reference to the breeding of the water birds, and important facts in regard to this point were collected by him. Full series of his specimens have been presented by him to the Institution.

Exploration of the Coast of Labrador and of Greenland, by Williams College.—This expedition, composed of students of Williams College, under the direction of Prof. Chadbourne, spent several months along the above-mentioned coasts, making interesting collections of natural history, selections from which have generously been supplied to the Smithsonian Institution.

Explorations on the Southern Coast of the United States.—Interesting collections from the vicinity of Micanopy have been received from Dr. Bean, and others from Dr. Bryant. Dr. J. B. Holder, now medical officer at Fort Jefferson, Tortugas, has made valuable contributions, chiefly of birds and eggs, serving to extend and complete those of Captains Wright and Woodbury, and Dr. Whitehurst. Specimens of several rare birds were also received from Captain Woodbury. From Mr. Maslin and Mr. Keyser, tidal observers of the United States Coast Survey, collections were also received, made in the vicinity of Charlotte harbor and Cedar Keys. Sergeant Alexander, at Fort Macon, North Carolina, has also transmitted numerous specimens.

Dr. Stimpson and Mr. Gill spent some weeks in the vicinity of Beaufort, North Carolina, during the past spring, and occupied themselves principally in an investigation of the marine fauna of that region. Many species of shells were collected, some of very remarkable character, as being previously known only as fossils of our coast deposits. Specimens of an *Amphioxus* were obtained, not recorded before as belonging to the American fauna.

Explorations in the interior of the United States.—Reference has already been made to the results of various Government expeditions in the Rocky Mountains and elsewhere. In addition to these, valuable

collections of animals from the vicinity of Cantonment Burgwyn, New Mexico, have been received from Dr. Anderson, United States Army, in completion of previous transmissions. These are of especial interest as showing an arctic type of the fauna in the high mountain regions of New Mexico, previously quite unexpected. The pine grosbeak, evening grosbeak, the crossbill, and similar species, appear to be constant residents. Dr. Anderson also collected many specimens in his march eastward through Texas; among them, the first skin of *Hypotriorchis femoralis* received by the Institution.

Dr. Irwin, United States Army, has also furnished important contributions from the vicinity of Fort Buchanan, in Arizona, embracing new species of reptiles and insects, and many rare birds and eggs.

An interesting collection of birds, plants, and other specimens of natural history was made in the vicinity of Fort Stockton, Texas, by Mr. Patrick Duffy, and is of value as illustrating the natural history of the high plains. Collections were also made in western Texas by Mr. F. Kellogg and Mr. F. S. Wade.

Important collections of nests and eggs of birds were made for the Institution by Dr. Hay, at Racine, Dr. Hammond, in Indiana, Mr. Tolman, at Winnebago, and others.

From Explorations in other parts of the World.—Captain Dow, of the Panama railroad service, has transmitted several collections during the year. The most important of these consist of shells, embracing several new rare species, and considered by Mr. Carpenter as of much value in determining the fauna of the west coast. A new species of *Anableps*, and other fishes, new genera and species of crustacea, &c., are also among his collections.

Dr. C. Sartorius, of Vera Cruz, has supplied desirable specimens of Mexican animals, illustrating the distribution of North American species. Mr. I. A. Nieto has contributed specimens of woods of many species of Mexican trees, and a series of coleoptera. Shells of the coast of Chili have been received from Mr. Flint, of Caldera; a very full collection of eggs of birds of Chili, prepared by Mr. F. Germain, from Don Jacinto R. Peña, of Santiago, &c. A series of birds of Guatemala, received from Mr. Osbert Salvin, will be of much service to American ornithologists, as embracing many species not otherwise accessible in this country to them.

Valuable specimens of birds and eggs of Greenland, and of northern Europe, have been received from the Royal Museum and the University Museum of Copenhagen.

Further indications of more or less important additions to our knowledge of the natural history of particular regions will be found in the list of donations subsequently presented.

WORK DONE IN CONNECTION WITH THE COLLECTIONS.

In accordance with your wish, the preliminaries to a distribution of the duplicates of the collection in the museum have been pushed forward as fast as possible during the year. The assorting of the large mass of shells belonging to the Institution, by Mr. Carpenter,

has progressed to such an extent that all the duplicate specimens of each kind belonging to the general Indo-Pacific fauna are now in separate boxes, which are arranged systematically and numbered, to correspond with the numbers of a printed list, so that sets can be picked out and distributed with but little trouble. In the labor of assorting and naming the collection, he has had the coöperation of Mr. Isaac Lea and Dr. E. Foreman, with the *Unionidae*; of Mr. Lea, with the water breathing univalves; of Mr. Binney, with the air breathing univalves; of Mr. Stimpson, with the east coast species; of Mr. Temple Prime, with the *Cycladidae;* and of Dr. A. A. Gould, with the species generally. All the type shells of the exploring expedition, and many of those of the North Pacific expedition, with large numbers of other shells, have been mounted by Mr. Carpenter, or under his direction, upon many thousand glass tablets, as referred to in the last report, page 70.

The systematic arrangement and determination of the other branches of natural history, their careful catalogue and operations necessary to the separation of duplicates and their distribution so as to be of most use, in nearly all the different departments of natural history has been carried forward very laboriously. In this, I have been much aided by the voluntary services of several gentlemen, especially by Mr. Elliot Coues and Mr. W. Prentice. The following table will show the amount of work of the kind done:

Table exhibiting the entries in the record books of the Smithsonian collection in 1860, *in continuation of previous years.*

	1851.	1852.	1853.	1854.	1855.	1856.	1857.	1858.	1859.	1860.
Skeletons and skulls	911	1,074	1,190	1,275	2,050	3,060	3,340	3,413	3,650	4,350
Mammals	.....	114	198	351	1,200	2,046	3,200	3,226	3,750	4,575
Birds	.....	.....	.....	4,353	4,425	5,855	8,766	11,390	15,913	20,875
Reptiles	.....	.....	.....	.....	.....	106	239	4,376	4,616	4,683
Fishes	.....	.....	.....	.....	.....	155	613	1,136	1,740	2,975
Eggs of birds	.....	.....	.....	.....	.....	.....	.....	1,032	2,525	4,425
Crustacea	.....	.....	.....	.....	.....	.....	.....	939	939	979
Mollusks	.....	.....	.....	.....	.....	.....	.....	.....	2,000	8,832
Radiates	.....	.....	.....	.....	.....	.....	.....	.....	1,100	1,308
Fossils	.....	.....	.....	.....	.....	.....	.....	.....	171	705
Minerals	.....	.....	.....	.....	.....	.....	.....	.....	793	1,132
Ethnological specimens	.....	.....	.....	.....	.....	.....	.....	.....	.....	550
Total	911	1,188	1,388	5,979	7,675	11,222	16,158	25,506	37,197	55,389

The actual number of entries during the year amounts to 18,192, or not far from twice as many as in 1859. The aggregate of 55,389 is, however, far from representing the entire number of specimens already recorded, some numbers covering tens and often hundreds each. Thus, of fishes there are at least 15,000 specimens recorded, and nearly as many of reptiles. Under the 4,425 entries of eggs, there are included 17,182 eggs and 1,294 nests, and other classes are in proportion.

With but trivial exceptions, the osteological specimens—the eggs and the mammals, birds and reptiles—are catalogued, though not all determined. The greater portion of the fishes, and of most of the other classes, excepting perhaps the shells, still remain to be done.

With the view of carrying out the arrangement between yourself and Drs. Torrey and Gray, in reference to the selection of a single series of all the botanical collections made and deposited by the various government exploring expeditions and received from other sources, the entire herbarium has been placed in their hands for the purpose.

Nearly all the mammals, the North American birds, and the exotic water birds exhibited in the museum, have been labeled with both scientific and vernacular names as far as these could be ascertained. The remaining specimens will be similarly treated as fast as they can be properly identified. The entire osteological collection has been placed on exhibition, as also the geological collections of the Pacific railroad and some other Government parties, in the northeast and southeast galleries of the museum hall, first opened to the public during the year.

A large number of skins of North American mammals and birds, not previously exhibited, have been mounted and placed in the cases. All the old stands of mounted specimens have been replaced by new ones, and the entire series is believed to be in a good condition, although much remains to be done for its perfection by adding deficiencies of North American species, and replacing old, faded, badly-prepared, and otherwise discreditable specimens, by fresher and better ones.

Of the collections mentioned in the last report as in the hands of collaborators residing out of Washington, the *Ophiuridae* have been returned, labeled, and identified by Mr. Theodore Lyman, of Brooklyn. Many new species were found among the Smithsonian specimens, which have been characterized in the proceedings of the Boston Society of Natural History, and will be described in detail in a monograph. The *Echini* of the North Pacific expedition have been worked up and returned by Mr. Barnard, and much progress made in the determination of the *Crustacea* and sea glars of the same expedition by Mr. Stimpson, and of its fishes by Mr. Gill. Mr. Cassin has completed his investigations upon the birds of Lieutenant Michler's expedition to the Atrato, and of the North Pacific expedition, and returned the specimens. The herpetology of the North Pacific expedition, originally prepared by Dr. Hallowell, has been revised and brought up to date by Mr. Cope, who has also made some important examinations of serpents in the collection of the Institution.

No reports of return of specimens have been made during the year by the gentlemen mentioned in the last report as having Smithsonian material in charge, as follows: *Turtles* by Professor Agassiz, *Etheostomoids* by Mr. F. W. Putnam, *Siluridae* by Dr. Wheatland, all of the Cambridge Zoölogical museum; fossil vertebrata collected by Dr. Hayden during the expedition of Lieutenant Warren, in the hands of Dr. Joseph Leidy, of the Philadelphia Academy. Of other series not yet mentioned in the present report, the coleoptera are in the hands of Dr. Le Conte, the neuroptera of Dr. Hagen, the diptera of Dr. Loew, the lepidoptera of Dr. Morris and Mr. Edwards, the water breathing univalves of North America of Mr. W. G. Binney, the west coast and exploring expedition shells of Mr. P. P. Carpenter. The birds of Captain Page's Paraguay expedition and of Lieutenant Herndon's

Amazon exploration are in course of examination by Mr. Cassin. Mr. Meek has completed the labeling of the fossils of Captain Simpson's expedition, collected by Dr. Engelmann.

Although so much labor has been expended in the examinations and investigation of the Smithsonian collection, a vast amount yet remains to be done before it can be considered as entirely exhausted of its novelties. Probably no collection of its size in the world contains so many types of published species, and so many yet new ones yet undescribed. This is especially the case in regard to North America, as well as to many other parts of the world. Much desire is therefore manifested by persons, about entering upon the preparation of monographs to secure the privilege of using Smithsonian specimens.

PRESENT CONDITION OF THE MUSEUM.

In the report for 1858 will be found an account of the most important collections forming the bulk of the museum of the Smithsonian Institution. It was continued in the report of 1859, and I beg leave to present at the end of the report a list of all the donations received in 1860.*

Numerous specimens were received during the year from expeditions referred to in the last report, as from Captain Simpson, Captain Raynolds, Lieutenant Mullan, Mr. John Xantus, Mr. John Feilner, Robert Kennicott, Dr. Bean, and others.

These additions to the museum have resulted in the filling up of many important gaps, and in replacing many defective specimens by better ones. By the arrangements in progress for distribution of duplicates, and the removal from the building of what is neither worth

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* For convenience of reference, I continue the enumeration of collections, made chiefly during certain explorations, from page 71 of the report for 1859:

73. Collections made during the march of troops to Oregon, *via* Fort Benton, under Major G. H. Blake, by Dr. Cooper.
74. Collections made in the Gulf of California, by the party of Captain C. P. Stone.
75. Collections made on the coast of California, by Dr. C. S. Canfield.
76. Collections made in the Mackenzie river district, by Mr. B. R. Ross, with the coöperation of other officers of the Hudson Bay Company.
77. Collections made on the north shore of Lake Superior, by Mr. George Barnston.
78. Collections made at Moose Factory, by Mr. J. McKenzie.
79. Collections made in James bay, by Mr. C. Drexler.
80. Collections made on the coast of Labrador, by Mr. Elliot Coues.
81. Collections made in Greenland and Labrador, by the Williams College Lyceum of Natural History.
82. Collections made on the coast of North Carolina, by Dr. Stimpson and Mr. Gill.
83. Collections made at Cantonment Burgwyn, N. M., on the Pecos, by Dr. W. W. Anderson.
84. Collections made on the Texas boundary survey, by Mr. J. H. Clark.
85. Collections made in Puget Sound, by J. G. Swan, Esq.
86. Collections made at the Tortugas, by Dr. J. B. Holder.
87. Collections made in Cuba, by Mr. Charles Wright.
88. Collections made in Minnesota, by Mr. J. M. Woodworth.
89. Collections made in New Mexico, by Patrick Duffy, Esq.
90. Collections made on the Labrador Eclipse Expedition, by W. A. Henry.
91. Collections made on the Atlantic coast of the United States, by Lieutenant J. D. Kurtz
92. Collections made in Chili, by Mr. F. Germain, through Don J. R. Peña.
93. Collections from Sable Island, by P. S. Dodd, Esq.
94. Collections from Nova Scotia, by J. R. Willis and W. G. Winton.

keeping nor giving away, it is confidently believed that instead of an unmanageable accumulation of material in the store-rooms its bulk will be reduced to at least one fourth, or more, of the present amount.

In accordance with the policy adopted by you, the efforts of the Institution have been directed mainly to the completion of its series of specimens illustrating the natural history of North America. At the present time it is believed, upon the whole, to have accomplished this aim to an extent greater than any other museum in the world. As far as regards mammals and their skulls and skeletons, birds and their eggs, reptiles, fishes, shells, crustaceans, and invertebrates generally, except certain orders of insects, (vertebrate fossils, and plants,) from the regions west of the Mississippi; it is probably not exceeded by any museum in the number of species and extent of the series, few additions remaining to be made to the list. At the same time, as successive groups are elaborated and labeled, and the duplicates distributed, the bulk of the whole becomes less and less, so that it is quite reasonable to assume that the present number of specimens will be reduced in a few years to less than half their present amount.

In addition to its American collection, derived from all the different sources, and including specimens from adjacent regions, necessary properly to illustrate it, the bulk of the Smithsonian museum consists of materials gathered by various Government expeditions in different parts of the world, and deposited here in compliance with the act of Congress. Other than as derived from this source, the exotic collections not relating to American natural history, are very small in amount, although usually of much interest from embracing numbers of new species. Among the exotic collections, the series of South American birds is believed to be among the first extant, while that of crustacea, annalids, corals, and certain families of radiata and mollusca, generally, are perhaps surpassed by very few.

As distributions of duplicates for the exotic collections are made, it is believed that the mass at present within the building will be so much reduced that the present accommodations will always be found ample for whatever may hereafter be added, as long as the present scope of the collections is adhered to. Of course, should Congress at any future time authorize an extension of the plan, the addition of exotic mounted mammals, birds, &c., would require much more space, and must be provided for by additional accommodations; these, however, would otherwise not be needed.

The great value of the museum of the Institution at the present time consists in its being the depository of so many type specimens, or those upon which the first description of species has been established. These constitute the great attraction to the scientific investigators, as, however carefully prepared the published description or figures of any species may be, there is almost always some doubtful point to be settled alone by an examination of the types. For this reason these are always guarded with jealous care, and considered of much more value than new and undescribed materials.

There are few collections embracing more original type specimens, or specimens relating to a large number of important works, than that of the Smithsonian Institution. Besides the reports of the United

States exploring expeditions of the Pacific railroad and Mexican boundary surveys, and of many other Government works, few monographs have been prepared in the United States for some years past without deriving many, or even most, of their novelties from the Smithsonian museum. The proceedings and transactions of most of the scientific journals of the country contain frequent and constant reference to its materials as the types. By the distribution of duplicates of these, therefore, and their judicious deposit at proper places in different parts of the world, a vast amount of good may be done, and the reputation of the Institution greatly enhanced.

LIST OF DONATIONS TO THE MUSEUM DURING 1860.

Abel, J. Ralls.—Seventeen-year locust, Albemarle, Va.
Alexander, Sergeant W., U. S. A.—Nests and eggs from Fort Macon, near Beaufort, N. C.
Allen, W. T.—Birds, nests, and eggs from Rippon, Va.
Ambrose, Rev. J.—Eggs of birds from Green Island, N. S.
Anderson, Chas. L.—Earths and minerals from Red River country.
Anderson, Dr. W. W.—Birds, eggs, and fossils from Pecos river and the Rocky Mountains.
Anthon, Henry, Jr.—Fourteen specimens of native timber from the Island of Borneo.
Anthony, J. G.—Collection of melanian shells; four species of gyrotoma from Ohio.
Angus, Jas.—Seventeen-year locust.
Arny, Wm. M. F.—Insects in alcohol from Kansas.
Ayres, Dr. W. O.—Shells, skulls of seals, and cetaceaus (deposited) from California coast.
Baker, Chas. L.—Tusk of boar from Washington.
Barnston, Geo.—Skin and skeleton of caribou, nests and eggs of birds, and specimens in alcohol, from Lake Superior.
Beadle, D. W.—Eggs of birds and alcoholic specimens from Canada.
Bean, Dr. J. B.—Nests, eggs, and reptiles from Micanopy, Fla.
Beesley, Thos.—Birds' eggs from New Jersey.
Benson, President.—Lignite coal from Cape Palmas.
Bickmore, A. S.—Nests and eggs from Hanover, N. H.
Bishop, N. H.—Nests and eggs of birds and living Pine snakes from New Jersey.
Blakiston, Capt. T., R. A.—Birds and eggs from Saskatchewan Plains.
Blassom, W. W.—Petrified wood from Prince William county, Va.
Boardman, G. A.—Five skins of *Pinicola canadensis* and eggs of birds from New Brunswick.
Bode, J. L.—Mounted *Larus marinus* from New York harbor.
Bowman, Capt. A. W.—Birds from Fort Massachusetts, N. H.
Brackett, Geo. E.—Insects and skins of birds from Maine.
Bradford, Geo.—Collections of zoölogical specimens from Cuba, made by C. Wright.
Brendel, Dr. F.—Nests and eggs from Peoria, Ill.
Brewer, Dr.—Skin of *Turdus fuscesens.*

Bridger, J. L.—Two boxes eggs, nests, &c., from Tarboro, N. C.
Brooks, Capt. J. M., U. S. N.—Specimen of *Hyalonema mirabilis* from Japan.
Bryant, Dr. H.—Nests, eggs, and skins of birds from Labrador; Sternum of *Tachypetes aquila*, Bahamas.
Boyling, Capt.—Birds from Washington Territory.
Buckland, Rev. Mr.—Shells from Sing Sing.
California Academy of Natural Sciences.—Shells from California.
Campbell, A., Com. N. W. Boundary Survey.—Skins of bear and goat, alcoholic and other specimens, collected by Dr. Kennerly and Mr. Geo. Gibbs.
Campbell, Mr. R., per *B. R. Ross.*—Skins of marmot from Athabaska Lake, H. B. T.
Canseco, Don Valero, through *J. Xantus.*—Fossil shells, &c., from Cape St. Lucas.
Carleton, Major J. S., U. S. A.—Collections of natural history from near Fort Tejon, California.
Carpenter, P. P.—Sets of Mazatlan shells.
Catley, H.—Birds' nests from Oregon.
Ceseña, Donna Rosaria, through *J. Xantus.*—Nests and eggs from Cape St. Lucas.
Cassin, J.—Skin of *Cyanocorax coronatus* from Mexico.
Chicago Academy of Sciences and Agricultural Department, University of Chicago.—Eggs, nests, and skins of birds from Minnesota.
Clark, Dr.—Auriferous sand from Laramie Hills; gold from Cherry Creek.
Clark, Dr. John A.—Birds, nests, and eggs, and skin of diodon from Texas.
Clark, J. H., Texas Boundary Survey.—Nests, eggs, and skins of birds from Arkansas, and the line of Texas Boundary Survey, collected chiefly by C. S. McCarthy.
Clark, Wm. P.—Eggs from Medina, Ohio.
Clarke, L., through *R. Kennicott.*—Skins of birds, eggs, &c., from Great Slave Lake, H. B. T.
Clapp, Mr.—Skins of birds from Florida.
Clary, Capt.—Ammonite from Benicia.
Cleveland, J. T.—Dried hippocampus, or sea horse, from Florida.
Collier, D. C.—Centipede and skin of *Neotoma cinerea* from Denver City, Jefferson Territory.
Conradsen, R.—Skins and eggs of European and Greenland birds.
Cooper, Dr.—Nest and egg of *Trochilus evelynae* from Nassau, N. P.
Copenhagen Royal Museum.—Skins and eggs of birds from Greenland and Northern Europe.
Copenhagen University Museum.—Skins and eggs of birds from Greenland, star fishes, &c.
Corston, Wm.—Eggs of snipe, &c., from Big River, H. B. T.
Couper, Wm.—Nests and eggs, skin of *Nyctale richardsonii*, and other birds from near Quebec.
Coues, Elliott.—Skins and eggs of birds and alcoholic specimens from the coast of Labrador.
Crawford, Dr. S. W., U. S. A.—Set of elk horns from Fort Laramie.

Crossoman, A. J.—Piece of root from Roger Williams tree.
Curtis, M. A.—Skin of mole from Hillsboro', N. C.
Davis, C. P.—Mounted head of female deer, with horns; also rare eggs of American and European birds.
Davis, H.—Nests and eggs from Iowa.
Dawson, Prof. J. W.—Pleistocene fossils from Canada.
DeLeon, Dr., U. S. A.—Silver ores from Heintzelman vein, Cerro Colorado mine, Tubac, N. M.
DeSaussure, H.—Skins of mammals from Labrador and Mexico.
Diehl, J. S.—Minerals from California.
Dimmick, C.—Insects from Brockport, N. Y.
Dodd, P. N.—Skull of walrus, skins of seals, eggs of birds, shells, &c., from Sable Island, N. S.
Dodge, John W.—Skin of guillemot from Labrador.
Dodero, Donnas Juana and Pachita, through *J. Xantus*.—Nests, eggs of birds, and insects from Cape St. Lucas.
Dow, Capt. J. M.—Collections in alcohol from Central America.
Drexler, C.—Collections of natural history from Hudson's Bay.
Drouet, Mad. Helene.—Skins and eggs of rare European and American birds; prepared skins of carp.
Duffy, Patrick.—Zoölogical collections from Fort Stockton, Texas.
Dunlop, J. V., through *B. R. Ross*.—Skin of marmot and skins of birds from Fort Halkett.
Emery, Chas. A.—Package of small shells from Stratham, N. H.; microscopic earths from New Hampshire.
Etheridge, A. H.—Black squirrel from Tabasco, Mexico.
Ferrill, F.—Eggs from Savannah.
Feilner, John.—Birds, mammals, nests, eggs, &c., from California.
Fisher, Dr.—Eggs of owl and shells from Sing Sing.
Fitch, F.—See *Stone*.
Flint, C. L.—Shells from Chili.
Gabb, W. M.—Package of fossils.
Garnet, B.—Duck's eggs, with colored epidermis, from Fairfax Co., Va.
Garrison, O. E.—Skins of ducks, eggs, and plants from Minnesota.
Garton, John.—Fish from Abitibi.
Gerhardt, A.—Shells, insects, eggs of birds, &c., Georgia.
Gibbs—See *Campbell*.
Gill, Th.—Marine animals from Newfoundland, the West Indies, and the coast of North Carolina.
Gilliss, J. R.—Shells and fossils from Payta, Panama, and Aspinwall; also living grasshopper from Panama.
Gladmon, Mr.—Skins of mice from Rupert House, Hudson's Bay Territory.
Glasco, J. M.—Snakes from Gilmer, Texas.
Goodbow, Captain.—Skin of a hawk from White river.
Goodwin, E. M.—Can of fishes from N. Montpelier, Vermont.
Goss, B. F.—Nests, eggs, shells, &c., Kansas.
Gornley, James.—Mineralogical specimens from Pike's Peak.
Graeff, Ed. L.—Lepidoptera from New York.
Grayson, A. J.—Scalp of Curassow, and contents of its stomach, (nails, coins, gravel, &c.,) Mexico.

Griu, Donna Juana, through *J. Xantus.*—Coleoptera from Cape St. Lucas.
Gruber, F.—Skins and eggs of birds from California.
Guest, W. A —Jar, with sturgeon, from Ogdensburg, N. Y.
Gunn, Donald.—Nests, eggs, and skins, from Selkirk settlement.
Hale, Dr.—Skins of mammals from Essex county, N. Y.
Halifax, Boys of National School.—Marine shells from Halifax.
Hanks, Capt. Julian.—Fishes and shells from Socorro Island.
Hardisty, W. L., through *R. Kennicott.*—Fossil bones, skins of birds, and plants from the upper waters of the Yukon.
Hardisty, Mrs. W. L., through *R. Kennicott.*—Mammals and eggs from Great Slave Lake.
Harrington, Capt.—Star-fishes from Mt. Desert.
Haszlinsky, Prof. F.—Dried plants from Eperies, Hungary.
Hayes, Dr. S.—Alligator's eggs, insects in alcohol, from Aspinwall, and shells from Navy Bay.
Haymond, Dr. R.—Nests and eggs from Brookville, Indiana.
Henry, W. A.—Fishes in Alcohol, from Labrador.
Hepburn, Jas.—Eggs from San Francisco.
Hiawassee College.—Hymenoptera, from Tennessee.
Hildreth.—See *Lt. Mullan.*
Hillier, S. L.—Indian pipe, Fort Carver, Minnesota.
Hinman, W. M.—Skin of *Vespertilio pruinosus*, Platte river.
Hitz, John.—Series of minerals from United States and Switzerland.
Holder, Dr. J. B.—Birds and alcoholic specimens from Tortugas, and eggs of terns and pelicans from Florida.
Holman, Dr.—Skin of sea eel, from coast of Lower California.
Hopkins, A.—Eggs from Massachusetts.
Hoy, Dr. P. R.—Nests, eggs, and birds, from Wisconsin.
Hubbard, Samuel.—Japanese seeds and tea; silver ore from Washoe mine.
Hulsner, Gustav.—Insects from vicinity of New York.
Irwin, Dr., U. S. A.—Minerals, skins, reptiles, and fishes in alcohol, from New Mexico; skins of birds, including male and female Mexican wild turkey, with nests and eggs of birds.
Janney, N.—*Neotoma floridana*, and skin of Connecticut warbler, Loudoun county, Virginia.
Jewett, Col. E.—Jaws of killer whale, off coast of Payta, and fossils from Mt. Lebanon and near Beyrout.
Jones, Dr. W. L.—Alcoholic specimens of fishes, reptiles, shells, &c., Georgia.
Jung, C. F.—Neuroptera, diptera, &c., from vicinity of New York.
Kellogg, Hon. Mr.—Polished gypsum, from Michigan.
Kellogg, F.—Nests, eggs, birds, and insects from Wheelock, Texas.
Kennicott, R.—Bird skins and alcoholic specimens, Fort William, Lake Superior; skins of birds, mammals, shells, insects, fish, &c., from Fort Simpson, H. B. T.
Kennerly—See *Campbell.*
Kurtz, Capt. J. D.—Shells of United States coast.
Kirby, Rev. Mr., through *R. Kennicott.*—Eggs and birds from Lake Winnepeg.

Keyser, Charles.—Can of alcoholic specimens from Egmont Key, Florida.
Kite, Wm.—Larva, and perfect insect of Clytus from Pennsylvania.
Krieghoff, C.—Eggs from near Quebec.
Krider, J.—Forty specimens *Arvicola*, Philadelphia, and *Bassaris* from Mexico.
Laszlo, C.—Alcoholic specimens from Mexico.
Latimer, Dr. J. T.—Cast of arca, Virginia.
Lander, Col. F. W.—Reptiles and mammals, collected by J. S. Snyder, (including *Lagomys princeps.*)
Lapham, Dr. J. A.—Land shells from Wisconsin.
Lauer, F.—Borings of an artesian well at Reading, Vermont.
Lazar, Count Coloman.—Fossil land shells from Laswaro, and recent land shells from Transylvania.
Le Conte, Dr. J. L.—Mammals, reptiles, and astaci, types of Major Le Conte's species.
Lewis, James.—Shells from Mohawk, New York.
Libhart, Messrs. A. C. & S. S. H.—Nests and eggs from Marietta, Pa.
Lincoln, Charles D.—Birds' eggs from Massachusetts.
Lindhoelm, Capt.—Shells from Magdalena bay.
Lindheimer, F.—Salamanders from Texas.
Lockhart, Jas.—Skin of Rocky Mountain goat, robe of musk-ox, and fossils from Mackenzie's river district.
London Zoölogical Society.—Egg of summer duck from garden of the Zoölogical Society.
McCarthy, C. S.—See *J. H. Clark.*
Macomb, Capt. J. M.—Collections of geology and natural history, from New Mexico, chiefly collected by Dr. J. S. Newberry.
Mactavish, George F.—Skins of weasels and birds from Hudson's bay.
Mactavish, Wm.—Ptarmigans, small mammals, fishes, &c., from Fort Churchill, H. B. T.
McAllister, W.—Skin of evening grosbeak, from Racine.
McCown, Capt. J. P., U. S. A.—Skins of birds, &c., from Fort Randall.
McCurdy, L. R. S.—*Pentremites florealis*, &c., from Indiana.
McDonald, M.—Fossils from Lexington, Va.
McFarlane, R., per *B. R. Ross.*—Skin of barren ground bear, Esquimaux dress, and other articles from Lower Mackenzie's river.
McKenzie, Alexander, per *B. R. Ross.*—Mammals and birds from Fort Liard.
McKenzie, J.—Skins of birds, and eggs from James' bay.
McLean, W. M.—Two hawk's eggs from Virginia.
Mallet, Prof. J. W.—Shells from near Mobile.
Mallory, Hon. Robert.—Tooth of fossil horse, Big Bone Lick, Ky.
Marsh, Geo. P.—Native sulphur from Sicily.
Marston, Rev. S. W.—Insects and eggs of birds from Iowa.
Maslin, Geo. W.—Eggs, shells, and alcoholic specimens, from St. George Island.
Michell, Rev. F. A.—Bear skull and fossil invertebrates, from Phantom Hill, Iowa.
Morgan, Mr.—Eggs from Fairmount, Va.

Mullan, Lieut.—Fish, birds, eggs, and nests, and alcoholic specimens, from Rocky Mountains, collected by J. Pearsall.

Mullan, Lieut.—Zoölogical, mineralogical, and botanical collections from Rocky Mountains, between Coeur d'Alene and Fort Benton, made by Mr. Hildreth.

Murray, W.—Cones, leaves, and wood of coniferae, from California.

Navarro, Don Ramon, per *J. Xantus.*—Living jays and *Bassaris* from Cape St. Lucas.

Newberry, Dr. J. S.—See *Macomb.*

Newberry, Dr. J. S.—Shells from various localities.

Newton, Alfred.—Skins of lemming and hare, collected on voyage of ship Enterprise, Arctic America.

Mason, W. A.—Fluviatile shells from western New York.

Ojeda, Don Marcellino, per *J. Xantus.*—Dried plants from Cape St. Lucas.

Osio, Don Juan, through *J. Xantus.*—Shells from Cape St. Lucas.

Osio, Donna Beatrice, through *J. Xantus.*—Coleoptera from Cape St. Lucas.

Packard, A. S.—Nests and eggs from New Brunswick.

Page, Capt. T. J., U. S. N.—Zoölogical, botanical, and geological collections from La Plata expedition.

Paine, C. S.—Eggs and birds from Vermont.

Parker, S. M.—Insects, &c., from Massachusetts.

Patent Office.—Ancient Roman sarcophagus, brought from Beyrout by Com. J. D. Elliott; marble slab from the plains of Marathon, brought by Com. Elliott; also, two picture frames made of hickory and live oak, a part of the latter from the old frigate Constitution. (These frames inclose accounts of the two preceding articles.)

Peale, T. R.—Plaster mold for making casts of a stone tablet from the ruins of Palenque, in Central America.

Pearsall, J.—See *Lieut. Mullan.*

Pedrin, Don Antonio, through *J. Xantus.*—Insects and birds from Cape St. Lucas.

Peña, Don J. R.—Seventy species eggs of birds from Chili, South America.

Peters, Dr. Thos. M.—Skin of blackbird.

Philadelphia Academy Natural Sciences.—Duplicates of Mexican reptiles from Xalapa; skeletons and skulls of mammals in exchange.

Pickering, Capt., U. S. N.—Diptera from Cape Florida; shells and other marine animals from Key West.

Poey, Prof. F.—Fishes and birds from Cuba.

Poole, H.—Specimens of nitro-boro-calcite, *Productus lyelli*, fossil plants, shells, &c., from Windsor, N. S.

Pope, Capt. J., U. S. A.—Alcoholic specimens from New Mexico.

Porter, Com., U. S. N.—Fishes from west coast of Central America.

Potts, John.—Reptiles and birds from Chihuahua.

Pourtales, L. F.—Fishes and crustaceans from Florida.

Purchased.—Cast of gorilla skull, Gaboon.

Rankin, James.—Shells from Long Island.

Ravenel, Dr.—Fungi of South Carolina, (Fasciculus V.)

Raynolds, Capt. W. F., U. S. A.—Specimens of natural history from upper Missouri, collected by Dr. Hayden; and of zoölogy, by G. H. Trook, Jas. Stevenson, and Wm. Vincent.

Reed, Peter.—Lower jaw of *Ursus americanus*, from a peat bog in Washington county, New York; *Larus arcticus*, from Washington county, New York.

Reed, Wm. M.—Skins and eggs of birds from Racine, Wisconsin.

Reid, J.—Skins of birds, eggs, mammals, &c., Great Slave Lake.

Remond, Mr.—Fossils from Cache le Poudre.

Richards, Frank.—Eggs of *Pyranga aestiva*, Fairfax county, Va.

Roberts, J. H.—Shells, &c., from Illinois.

Ross, B. R.—Very complete collections of animals, plants, eggs, &c., from the Mackenzie River District.

Rousseau, W. A.—Birds nests from Troy, New York.

Rowell, Rev. Jos.—Shells from California.

Riise, A. H.—*Conurus xantholaemus*, from St. Thomas; and ophiurans, reptiles, &c., from West Indies.

St. Charles College, La.—Coleopterous insects, birds, and reptiles, from Louisiana.

Samuels, E.—Microscopic slides.

Sartorius, Dr. C.—Crustaceans, insects, and vertebrates, from near Vera Cruz.

Salvin, O.—One hundred and thirty species Guatemala birds.

Schafhirt, F.—Skeleton of *Cistudo carolinensis*, from the District of Columbia.

Schneider, L.—Skins of birds.

Schoonover, Major.—Robe of grizzly bear skin from Yellow Stone river.

Schott, A.—Shells from Humboldt Bay, New Granada.

Schultz, Wm.—Living alligator, from Georgia.

Sclater, P. L.—Skins of birds from Mexico and Jamaica.

Sherman, Capt.—Shells from Magdalena Bay.

Shumard, Dr. B. F.—Insects from Texas.

Simonds, E.—Skins of mammals, birds, skeletons, &c., from Essex county, New York.

Simpson, Capt. J. H.—Minerals and rocks from Utah, collected by H. Engelmann.

Skilton, J. Avery.—Reptiles, fishes, shells, and two living Sirens, from Georgia.

Slack, Dr. J. H.—Eggs of grebe and tern, from Minnesota.

Slagle, Mr.—Eggs and tertiary fossils from Virginia.

Smith, Dr. J. Bryant.—Birds, reptiles, insects, crustaceans, and seeds, from Jamaica.

Somers, Dr., through *Dr. Bohrer.*—Quartz crystal from Virginia, inclosing a drop of water.

Snyder, J. S.—See *Lander.*

Stagg, T. J.—Seventeen-year locust, from Pennsylvania.

Stair, D. F.—Old cup, coin, and beetle, from Hanover, Pennsylvania.

Stanley, J. S. A.—Fossils from Los Angeles, California.

Stearne, Mrs. J. S.—Portion of Stump of a tree which stood in front of Washington's marquee, at Valley Forge, Pa., in the winter of 1777–78.

Sternbergh, S.—Alcoholic specimens from Panama.
Stewart, George.—Skins of reptiles, nests, eggs, insects, &c., from Alabama.
Stimpson, Wm.—Alcoholic specimens and shrew, from the coast of Maine.
Stone, Capt. C. P.—Shells from Gulf of California, collected in part by F. Fitch, Esq.
Swan, Jas. S.—Shells, sponges, and other specimens of natural history, from Ne-ah Bay, W. T.
Swanston, Thos., per *R. Kennicott.*—Skins of *Arvicola*, birds, &c., from Great Slave Lake.
Suckley, Dr. George.—Birds, eggs, mammals, and alcoholic specimens, from Fort Kearny and Fort Laramie.
Taylor, N., per *B. R. Ross.*—Skin of young musk ox, from Fort Norman.
Tolman, J. W.—Eggs from Winnebago, Illinois.
Totten, Gen. Jos. G., U. S. A.—Minerals from California.
Tracy, Henry.—Eggs, skin of night-heron, and fish, from coast of Maine.
Travers, Capt. D. B.—Duck eggs with black shells, from Virginia.
Turner, Mr.—Skins of squirrels from Hanno Bay.
Uhler, P. R.—Neuroptera for Dr. Hegan.
Unknown.—Shells from Monroe county, Mo.
Unknown.—Living green snake, *Letophis aestivus.*
Unknown.—Humming birds' nests.
Unknown.—Living Carolina rail.
Vanskiver, Jas.—Remora from Blackstone Island, Potomac river.
Veatch, Dr. J. A.—Shells from California.
Venable, T. P.—Bones of the head of a *Delphinus*, from the Pacific.
Villaescusa, Donna Francisca, per *J. Xantus.*—Large shells from Cape St. Lucas.
Villasana, Donna Jesus, per *J. Xantus.*—Shells from Cape St. Lucas.
Vogel, C.—Box of coleoptera, from Rhineland, Mo.
Wallace, J. W.—Serpents and dried *Amphiuma*, from Louisiana.
Walsh, D. B.—Diptera, hymenoptera, and neuroptera, from Illinois.
War Department.—Mass of native copper, from Ontonagon, Michigan.
Warren, Geo. B.—Eggs from New York.
Welch, Geo. W.—Mounted skunk, red-necked grebe, nests, and eggs, from Massachusetts.
West, Silas.—Orthopterous insects from Maine.
Wharton, Jos.—Specimens of zinc and spelter.
White, Lieut. J. W.—Marine invertebrates, radiata, &c., from Puget Sound.
Wilcox, H. B.—Nests, eggs, shells, and alcoholic specimens from Michigan.
Willis, J. R.—Skins of birds, eggs, shells, &c., from Halifax.
Williamstown College Lyceum.—Nests and eggs from Labrador and Greenland.
Windle, J. E.—Eggs of coopers hawk and skin of snow bird.
Winston, W. G.—Lepidoptera and skins and eggs of birds from Halifax.

Winslow, R. K.—Skin of duck and eggs of birds from Ohio.
Wood, Wm. S.—Nests and eggs of *Geothlypis macgillivrayi* from Pike's Peak.
Wood, John C.—Dead alligator from Georgia.
Wood, Dr. Wm.—Skin of *Accipiter fuscus*, shrew, and nests and eggs, from E. Windsor Hill, Conn.
Worthen, Prof. A. H.—Types of fossils from Illinois.
Woodbury, U. S. A., Capt. D. P.—Birds from Tortugas.
Wright, J. J.—Portion of an Indian ax from Williamstown, N. C.
Wyman, Prof. J.—*Rana sinuata* from Adirondac Mountains; casts of head of Flat-Head Indian, and skull of Gorilla.
Wright, C.—See *Bradford.*
Xantus, J.—Very large collections of animals, eggs, plants, &c., of Cape St. Lucas.

LIST OF SMITHSONIAN PUBLICATIONS DURING 1860.

Astronomical Observations in the Arctic Seas. By Elisha Kent Kane, M. D., U. S. N. Made during the second Grinnell Expedition in search of Sir John Franklin, in 1853, 1854, and 1855, at Van Rensselaer Harbor and other points in the vicinity of the northwest coast of Greenland. Reduced and discussed by Charles A. Schott, Assistant United States Coast Survey; quarto, pp. 56, and one plate. (Published May, 1860.)

On Fluctuations of Level in the North American Lakes. By Chas. Whittlesey; quarto, pp. 28, and two plates. (Published July, 1860.)

Meteorological Observations, made at Providence, R. I., extending over a period of twenty-eight years and a half, from December, 1831, to May, 1860. By Alexis Caswell, Professor of Natural Philosophy and Theology in Brown University, Providence, R. I.; quarto, pp. 188. (Published October, 1860.)

Meteorological Observations, made near Washington, Ark., extending over a period of twenty years from 1840 to 1859, inclusive. By Nathan D. Smith, M. D.; quarto, pp. 96. (Published October, 1860.)

Researches upon the Venom of the Rattlesnake, with an investigation of the anatomy and physiology of the organs concerned. By S. Weir Mitchell, M. D., Lecturer on Physiology in the American Medical Association; quarto, pp. 156, and twelve wood cuts. (Published December, 1860.)

The preceding compose vol. XII of Smithsonian Contributions to Knowledge.

Tidal Observations in the Arctic Seas. By Elisha Kent Kane, M. D., U. S. N. Made during the second Grinnell Expedition in search of Sir John Franklin, in 1853, 1854, and 1855, at Van Rensselaer harbor. Reduced and discussed by Charles A. Schott, Assistant United

States Coast Survey; quarto, pp. 90, and four plates. (Published October, 1860.)

Annual Report of the Board of Regents of the Smithsonian Institution, showing the operations, expenditures, and condition of the Institution for the year 1859. 1 volume, 8vo., pp. 450; fifty-five wood cuts.

Instructions in reference to collecting nests and eggs of North American birds. 8vo., pp. 22; eighteen wood cuts.

Circular in reference to the history of North American grasshoppers. 8vo., pp. 4.

Circular in reference to collecting North American shells. 8vo., pp. 4.

Circular in reference to the degrees of relationship among different nations. 8vo., pp. 34.

Circular to officers of the Hudson's Bay Company. 8vo., pp. 6.

Check Lists of the Shells of North America, prepared for the Smithsonian Institution by Isaac Lea, P. P. Carpenter, W. Stimpson, W. G. Binney, and Temple Prime. 8vo., pp. 44.

List of duplicate shells collected by the United States Exploring Expedition under Capt. C. Wilkes, U. S. N. *Indo-Pacific Fauna.* 8vo., pp. 4.

Catalogue of the described Lepidoptera of North America. Prepared for the Smithsonian Institution by John G. Morris. 8vo., pp. 76.

REPORT OF THE SECRETARY.

1861

To the Board of Regents:

GENTLEMEN: In the discharge of my official duty as the principal executive officer of the Smithsonian Institution, I have the honor to present to you a report of the operations of the establishment for another year.

It could scarcely be expected that during the existence of an intestine war, and almost in the presence of two contending armies, the Institution should be able to conduct its affairs with the same persistence and success as in the tranquil years of its previous history. The interruptions and embarrassments, however, although frequent, and in some cases perplexing, have not prevented the continuance of the general operations of the Institution, or the prosecution of most of the special objects which had previously been determined upon as falling within the scope of the plan of its organization.

At an early period of the war it was for a time proposed by the government to occupy the building of the Institution as temporary quarters of some of the troops which were suddenly collected in defence of the capital. In relation to this proposition, it was represented to the War Department that there was no authority from the Board of Regents to grant the use of the building for the purpose intended, but that if the Secretary of War thought proper to take possession of the premises on his own responsibility, the best arrangements possible to secure the property from injury and at the same time to accommodate the soldiers, would cheerfully be made. It was, however, suggested that if an appropriation for such a purpose were found to be necessary, it would be more in accordance with the spirit of the Institution to employ the building as an infirmary. Fortunately, there was judged to be no absolute necessity for the contemplated occupation, and neither the building nor the grounds around it have been occupied for military purposes. In this, as in other instances, the government has evinced a considerate desire to protect the property of the Institution and to foster its operations.

It has been lately stated in a foreign journal, and the statement has

been widely copied in this country and in Europe, that the bequest of Smithson had been lost by improper investment; but those who are acquainted with the history of the establishment know that this statement is without the slightest foundation in fact. The government of the United States in accepting the bequest upon the stipulated terms of the will, became, by an act of Congress, approved by the President, the trustee of the fund and guardian of the Institution. The agent appointed to receive the money brought it to this country in British gold, and deposited it in the United States mint in Philadelphia, where it was recoined into American eagles. The government thus became, by express enactment as well as by the highest equitable considerations, responsible for the security of the funds as well as for the faithful administration of the trust. It is true that the Secretary of the Treasury, before the money had been permanently invested by Congress, lent it to several of the western States to assist in carrying on their works of internal improvement; but it would have been alike inconsistent with strict justice and the liberal policy of our government, to devolve on the Smithsonian fund any risk or loss which might result from this financial operation. Congress, therefore, declared, by a joint resolution, that the money of the bequest was to be considered as a fund lent to the Treasury of the United States, the interest of which, at the rate of six per cent. per annum, is to be applied to the perpetual support and maintenance of the Institution. It is proper to state in this connexion that the government itself will in time, probably, be reimbursed for the money advanced to the States, since, in accordance with a rule established by the Hon. Robert J. Walker, when Secretary of the Treasury, all money received in the Treasury on account of the States to which the loan was made is to be retained until the debt of each is fully satisfied. In this way nearly four hundred thousand dollars have already been received.

Not only does the original fund of Smithson thus remain safe and unimpaired in the treasury of the United States, but, after paying for the building, collecting a library and museum, and conducting all the operations which have given character to the establishment, out of the income; an extra fund has been accumulated from the interest itself, which, at the date of the last report, yielded seven thousand seven hundred and sixteen dollars.

Unfortunately, a part of this fund has been unproductive during the past year. A petition from the Board of Regents was presented

to Congress at two successive sessions requesting that the extra fund which had been thus economised might be received into the treasury of the United States, and form a permanent addition to the original deposit. The proposition was favorably commended to Congress by a report of the committees to which it was referred, but from the pressure of business the recommendation was not acted on, and the directors of the establishment were obliged to seek some other investment of the money. State stocks naturally presented themselves as apparently offering the safest means of accomplishing the desired object, and accordingly a committee of the Board decided upon the purchase of bonds of the States of Indiana, Virginia, and Tennessee. About $63,000 were expended in the purchase of the State stocks of Indiana, $50,000 in those of Virginia, and $11,000 in those of Tennessee. It is scarcely necessary to state that no interest has been received from Virginia and Tennessee since the date of the last report, and it is not probable that anything will be obtained from them for some years to come. The other sums invested in State stocks have yielded the usual amount of interest. The Virginia stock is still rated at 50 per cent. of its par value, and we trust that the State will, in time, be again able to discharge her obligations to this Institution; but in the interim there will be on this account a diminution in the annual income of nearly four thousand dollars.

As an offset to this effect of the unforeseen condition of the States above-mentioned, information has been received from London of the death, at an advanced age, of Madame De la Batut, the mother of the nephew of James Smithson, to whom an annuity was conceded as a compromise by the Hon. Richard Rush, with a view to the more expeditious realization of the Smithsonian legacy. The principal of this annuity, amounting to five thousand and fifteen pounds (about $25,000) will now be added to the bequest of Smithson, of which it originally formed a part.

It has been considered advisable, in view of the distracted state of the country and the failure of the States before-mentioned to pay their interest, to curtail the expenditures of the Institution, as far as practicable, without suspending what have been denominated the *active* operations. Yet, while this cautious policy has been closely observed, it is believed that the Institution has sustained its character for efficiency, and that, although it has been exposed to the disturbing incidents of a theatre of war, it has still accomplished much during the year, and steadily advanced in the career prescribed by

its enlightened founder—the increase and diffusion of knowledge among men.

Publications.—The thirteenth volume of the Smithsonian Contributions is partly completed, but, on account of the unsettled condition of the times, it was thought prudent to delay the printing of several expensive papers until the beginning of the present year. It will be seen, however, in the course of this report, that the whole number of pages of printed matter which has been issued, or is now ready to be issued by the Institution, equals that of any previous year.

The first paper which has been printed for the thirteenth volume is the concluding part of the results of the discussion of the observations of Dr. Kane, fully described in the last report. On the completion of this series of papers, a number of full sets of the several parts have been bound, with a general title page, into a separate volume, which is intended for distribution to astronomical and meteorological societies to which the contributions in full are not presented.

Another series of papers, partly printed, gives a full discussion of all the meteorological observations made during the voyage of Sir F. L. McClintock, in search of Sir John Franklin, in the English steamer Fox, from the 1st of July, 1857, to September, 1859.

The records of these observations were presented by the commander of the expedition to the Institution for discussion and publication, in accordance with the plan adopted for those of Dr. Kane; and since they relate to the meteorology of this continent, and are the results of a private expedition, it was thought entirely consistent with the policy of the Institution to discuss and publish them at the expense of the Smithsonian fund. It would be of great interest to science, and particularly to the meteorology of this country, if all the observations which have been made in the Arctic regions were reduced and discussed on a uniform plan, like that adopted in regard to the observations of Dr. Kane. A correspondence has been commenced with the proper authorities in England in regard to the importance of such a work, offering the co-operation of the Institution in carrying it into execution.

In regard to the history of the observations made during the voyage of the "Fox," the following facts may be stated:

The last expedition of the British government in search of Sir John Franklin returned in 1854, without doing more than confirming what

had previously been ascertained—that the missing ships had spent their first winter at Beechy island. Later in the same year the celebrated traveller of the Hudson's Bay Company, Dr. Rae, ascertained that the missing voyagers had been seen on the west coast of King William's land in the spring of 1850, and that it was supposed they had all died on an estuary of the Great Fish river.

The attempts, in 1855, of the Hudson's Bay Company to explore this river resulted in obtaining but little additional information and a few relics from the Esquimaux. It was at this time that Lady Franklin, who had previously sent out three expeditions, again urged the renewal of the search, that the fate of her husband and his companions might not be left in uncertainty. She, therefore, undertook once more the responsibility and expense of a final effort to "follow their footsteps in their last journey upon earth," and if possible to give to the world the scientific results of the expedition for which these gallant men had probably sacrificed their lives. In the spring of 1857 Lady Franklin commenced the preparations for the contemplated expedition, and intrusted the command of it to Captain McClintock. The small steamer "Fox," of 180 tons register, was purchased for the service, and was put in readiness by the end of June. The expedition sailed from Aberdeen July 1, 1857, and after a favorable run across the Atlantic, passed Cape Farewell, the southern point of Greenland, on the 13th of July, and arrived at Fredericshaab on the 19th of the same month. After taking in coal at Waigat, they arrived at Upernavik, and then bore away on the 6th of August directly westward, for the purpose of crossing Baffin's bay, but on the evening of the 8th their progress in that direction was stopped by impenetrable ice in latitude 72° 40′ and longitude 59° 50′. They then steered to the northward, in the hope of finding a passage westward, but in this they were disappointed, and, on the 19th of August, became entangled in the ice, and thus remained 242 days, until April, 1858. During this period the "Fox" drifted from latitude 75° north and longitude 62° west, to latitude 63° 40′ north and longitude 59° west, or 1,385 statute miles in a southeasterly direction, almost to the lower extremity of Greenland.

On the 26th of April the ice suddenly and almost entirely disappeared, and the ship was again headed northward for another attempt, and arrived on the 19th of June in Melville bay, and thence again steered westward across Baffin's bay, and finally entered Lancaster sound in the beginning of August. They thence sailed westwardly

and southerly until they reached the longitude of 96° west; thence returned along Barrow's strait to the east, and southerly down Prince Regent's inlet to the mouth of Bellot strait, where, at a place named Port Kennedy, the vessel remained from the 27th of September, 1858, till August 9, 1859. From this point various excursions, with sleds, were made in different directions. The expedition returned to England in September, 1859.

During the whole continuance of the expedition a series of meteorological and other observations was made. Those of the first year were taken while the vessel was in a constant state of motion either sailing through the water, or drifting down Baffin's bay with the immense field of ice. Those of a considerable part of the second year were made while the ship was stationary at Port Kennedy.

The observations have all been arranged in four parts: the first relating to temperature; second, to winds; third, to atmospheric pressure; fourth, to miscellaneous phenomena, such as auroras, weather, specific gravity of sea-water, ozone, &c.

In the discussion of the records, the whole series has been divided into two groups, one of which is referred to a point in Baffin's bay, and the other to Port Kennedy.

The discussion of the temperatures of each group embraces—

1st. Diurnal variation.
2d. Annual variation.
3d. Relation of temperature to the phases of the moon.
4th. Temperature of different winds.
5th. Temperature of sea-water.

The discussion of the winds includes—

1st. Resultant direction for each month, season, and year.
2d. Velocity for each of these periods.
3d. Frequency of winds from different quarters.
4th. Quantity of air which passed over the station.
5th. Rotation of the winds.
6th. Investigation of particular storms.

A similar series of discussions is also given with regard to the barometer. These discussions have all been made at the expense of the Institution by Charles A. Schott, of the Coast Survey, according to the methods adopted by Sir John Herschel, in his admirable article on meteorology in the last edition of the Encyclopedia Britannica. They bring out a number of interesting results, particularly in regard to the rotation of the wind, the effect of the moon on the temperature, and the

connexion of changes of the weather in the arctic regions with those in the more southern latitudes of the continent of North America.

The observations for temperature were made at equal intervals day and night; in winter they were generally taken every two hours, in the summer every four hours. The register extends over twenty-seven months, and comprises a total number of 7,113 observations.

The highest monthly mean temperature occurred in July. In the first year, 1857, in latitude 62°, it was 45°.53. In the second year, (1858,) in latitude 74°.4, it was 36°.60. In 1859, latitude 72°, it was 40°.12. The lowest monthly mean temperatures were in January. That in 1858, in latitude 73°.2, was —24°.87. The second, that in 1859, in latitude 72°, was —33°.57.

The mean annual temperature of the year, as deduced from all the observations at Port Kennedy, in latitude 72°, was 1°.85. The highest temperature observed at the same place was 55°, which occurred July 29, 1859, and the lowest —49°.8, January 21 and February 15 of the same year.

The extreme range, therefore, was 104°.8.

The highest temperature observed by Kane at Van Rensselaer harbor, in latitude 78°.37, was 51°, and the minimum —66°.4, giving a range of 117°.4

The greatest daily range of temperature was in June, amounting to 9°.60; the least in December, when it was 0°.84. At Van Rensselaer harbor, the greatest range occurred in April, and was 9°.09; and the least in November, amounting to 1°, showing a correspondence in amount of variation, but not in time.

On an average, the maximum temperature is reached between noon and 1 p. m., and the minimum between 2 and 3 a. m.; whereas at Van Rensselaer harbor, as observed by Dr. Kane, these hours were respectively 2 p. m. and 1 a. m.

One of the most interesting points of the discussion of the observations is that of the connexion of the phases of the moon with the low winter temperatures. This connexion was early suggested by arctic explorers, and was independently deduced from the observations by Kane. In order to investigate the question of this connexion the mean daily temperatures were divided into periods of five days, thus forming a table in which the dates of the occurrence of full and new moon are given with the corresponding mean temperatures. By taking the differences of the mean temperatures it is seen that the mean temperature is lower at full moon than at new moon by about

$7\frac{1}{4}$ degrees. This difference is less than that deduced from the observations of Kane at Van Rensselaer harbor, but of the same kind, and serves to establish the fact of the occurrence of maximum cold at the period of full moon. Mr. Schott, in his paper on the discussions of Kane's observations, has referred this cold to a secondary action. The moon, as is now established by direct experiment, radiates and reflects a considerable amount of heat to the earth, which is of the kind called dark heat, or that of such low intensity as to be readily absorbed by the vapor of our atmosphere, and particularly by clouds. The effect, therefore, of the full moon is to dissolve the clouds, and thus to give freer passage to the radiated heat from the earth into celestial space.

In order, however, that this explanation should be true, it is necessary that the heat from the moon should be more penetrating and have more effect upon the clouds than that from the earth; and that this is the case is not improbable, as a part of the heat from the moon is that reflected from the full meridian sun, while that given off from the earth is merely due to its own nocturnal radiation.

It is not probable, as we have stated in a previous report, that an equal difference of temperature at the time of new and full moon will be observed in middle latitudes, for, from the observations made at this Institution, the waves, as it were, of cold which reduce the temperature of the United States, frequently begin several days earlier at the extreme west; and hence while the full moon occurs nearly at the same moment of absolute time at all places on the surface of the earth, the maximum cold might occur in one place at the new, and in another at the full moon. In the arctic regions, on the other hand, where the moon is at the same moment visible from every meridian, the effects of its heat must be more perceptible and less masked by the operation of other causes. In the observations of a long series of years, however, the difference may, perhaps, be rendered manifest, even in the latitude of Washington.

Professor Dove, of Berlin, has called attention to the remarkable recurrence of cold about the 11th of May of each year, but nothing of this kind can be deduced from the observations during the voyage of the "Fox," although from the observations by Kane at Van Rensselaer harbor on the 13th of May, 1854, the temperature was 9°.3 lower than that computed for the mean of the same day at the same place.

The diminution of temperature at this period is evident from the

observations for long series in this country as well as in Europe, and has been attributed to some cosmical influence affecting the absolute amount of heat received by the earth at this time.

The deductions relative to the elevating and depressing influence of the wind upon temperature, show that in Baffin's bay the southeast winds are the warmest, and the southwest the coldest, and that the temperature is lowest during calms.

They show, also, that at Port Kennedy the east winds are the warmest, and the north winds the coldest; there, also, calms are attended with a depression of temperature.

Observations were made upon the temperature of the soil, by sinking a brass tube two feet two inches vertically into the ground. A padded thermometer was inserted in the tube, and the whole was covered with snow. The temperature in the external air was lowest about the 19th of January, and that in the tube about the 10th of March, when it reached + 5°. Hence the greatest cold in the ground at a depth of a little more than two feet occurred fifty-seven days later than at the surface.

In discussing the observations relative to the winds, the whole period, as in the case of the discussions of temperature, is divided into two parts—the first when the Fox was in Baffin's bay, and the second when she was at Port Kennedy. The number of daily observations varied from six to twelve; in all cases, however, at regular intervals. The method of reduction is that of Lambert, improved by Herschel and others, so as to include the velocity of the wind, and not merely the relative frequency.

The amount of wind, as estimated by the continuance and velocity from all directions, was resolved, plus and minus, into two directions—one, that of the meridian, and the other at right angles to it; and from these two components a resultant was deduced for each month, giving the average direction from which the wind came. In this discussion Mr. Schott assumes the south point of the horizon as the zero point, because azimuths in astronomy are read in this way, and he prefers reckoning from the south to the west, rather than from the south to the east, because the wind-vane is found to rotate more frequently in the former direction.

The great variation in the direction and force of the atmospheric currents renders the calculation of resulting values for shorter intervals than a month unnecessary. At Port Kennedy the resulting direction of the wind is remarkably constant for different seasons.

In winter it is northwest by north; in summer north $\frac{3}{4}$ths of a point west; for the whole year, N.NW$\frac{3}{4}$W. The corresponding directions for Baffin's bay are nearly the same, and the final resultant direction for the year at the two localities are practically identical.

In the first year, while in Baffin's bay, the velocity of the wind was greatest in February and March, and least in June and July. In the second year, at Port Kennedy, it was greatest in October and November, and least in March and April.

The greatest amount of wind, both at Port Kennedy and Baffin's bay, was from the northwest, in accordance with the theory of the descent or sinking down of the heavier air in the colder regions, and its flowing thence to warmer portions of the earth. For the purpose of ascertaining the law of the rotation of the winds, the records were examined in reference to the number of times the vane arrived at each of the eight principal points, and also in reference to the sum total of angular movement in a direct and retrograde direction.

From this investigation it appears that the direction of the shifting of the wind in spring was direct; at other seasons retrogade, and that the total amount of angular motion in the course of a year was very nearly balanced.

At Rensselaer harbor the resultant rotation of the wind was found to be direct, and this was also the case in Baffin's bay, although it would appear from these discussions, that the law of the rotation of the wind which has been found to prevail in lower latitudes, does not hold with the same constancy in the arctic regions.

In the year 1857–'58, in Baffin's bay, there were 26 storms of an average duration of 19 hours; in these storms the prevailing winds were, almost to the exclusion of all others, from the northwest and southeast. At Rensselaer harbor, according to Kane, the winds during the prevailing storms were from the same points of the horizon. At Port Kennedy during the year 1858–'59 there were 22 storms recorded, in which the wind was from the northwest; in a few cases it was from the northeast; but in not one from the northwest or southeast.

The third part of the McClintock observations relate to the pressure of the atmosphere. These observations were recorded at equal intervals of two hours at one period, and of four hours at others. They were made with a mercurial barometer, and also with an aneroid.

The records of the readings of the two instruments were compared,

and from them a correction obtained to be applied to the aneroid. The differences appear remarkably regular, and show that the mean monthly readings of the aneroid may be relied on to the hundredth of an inch. The average correction was found to be .022 of an inch, a quantity which, strictly speaking, is composed of two parts, namely: of the true index error of the aneroid, and the specific differences of the two instruments in different latitudes. In the mercurial barometer a mass of metal is balanced against a mass of air, and, therefore, the indications are independent of a change of gravity, for the same reason that a pound weight in an ordinary scale balance is in equilibrium with the same amount of the material weighed, in whatever latitude the experiment may be made. Not so, however, with the aneroid barometer; as this instrument, like the spring balance, indicates the pressure by the reaction of an elastic material, it must be affected by a change in gravity, and consequently varies in its indications with a change of latitude.

The diurnal variation in the pressure of the atmosphere in the higher latitudes of the arctic regions is very small, and can only be satisfactorily traced by means of the combination of a great number of observations, while the fitful variations in the atmospheric pressure are frequently very large.

The minimum pressure both at Baffin's bay and at Port Kennedy occurred at about half after four o'clock a. m., and the maximum at about half-past seven o'clock p. m. The range of the diurnal fluctuation in Baffin's bay is .028, at Port Kennedy .048, and at Rensselaer harbor .010. There is, therefore, a diminution in the range as we go northward, and at the same rate diurnal variations would become insensible at about 80° of latitude.

The average height of the barometer varies in different months of the year; it is greatest in April and May.

The occurrence of the minimum is not simultaneous at the different stations; at Baffin's bay it was in January, at Port Kennedy in July, and at Rensselaer harbor in September, presenting results which clearly indicate that more observations are required to fix with precision the time at which it really takes place. The annual range of the barometer at Baffin's bay was .44, at Port Kennedy .41, and at Rensselaer harbor .21.

The relative pressure connected with different winds is also given. In Baffin's bay the north wind gave a maximum pressure; at Port Kennedy, and also at Rensselaer harbor, the south wind produced

this effect. In Baffin's bay the minimum pressure accompanied the southeast wind, while at Port Kennedy the same effect was produced by the northeast wind, and at Rensselaer harbor by the west and northwest. The lowest reading of the barometer occurred just before the commencement of violent storms.

Among the miscellaneous observations, perhaps the most important is one which relates to the aurora borealis. Captain McClintock observed that the streamers in all cases of the exhibition of this meteor appeared to come from the surface of open water, and not in any case from the fields of ice. This observation would go far to establish the truth of the hypothesis that auroral displays are due to electrical discharges between the air and the earth, and that these are interrupted by the interposed stratum of non-conducting ice.

On the occasion of a visit of Lady Franklin last summer to the Smithsonian Institution, I had the satisfaction of receiving, on behalf of the Regents, her expressions of thanks for the discussion and publication of these observations, connected as they are with the memory of her lamented husband.

Another paper which has been accepted for publication is entitled "Ancient Mining on the Shores of Lake Superior." This paper was received in July, 1856, but, owing to imperfections in the manuscript, its publication was indefinitely postponed. The subject, however, of which it treats has lately received so much additional interest from the investigations of the archæologists of different parts of Europe that we were induced to submit it again to the author for correction, and to have a more accurate map of the mining region prepared, as well as corrected drawings of the implements made, under the immediate superintendence of the Institution. The wood-cuts are now in the hands of the engraver, and the memoir will be prepared for distribution without unnecessary delay.

On reference to the first volume of "Smithsonian Contributions" it will be seen that among the contents of the mounds of the Mississippi valley, as figured by Squier and Davis, are implements and ornaments of copper, such as axes, chisels, knives, spear heads, rings, bracelets, &c. The copper of these articles frequently contains small portions of pure silver—perhaps originally in the form of crystals—which serve in a measure to identify the source from which the material came. Pure copper is comparatively a rare mineral, and nowhere on the surface of the earth has it been found in greater quantity and in larger masses than in that remarkable projection from

the southern shore of Lake Superior, called Keweenaw Point. Through the whole of this peninsula a band of metalliferous deposit extends more than a hundred miles in length, and from one to six miles in width. Within this band pure copper is found in immense masses, also in thinner veins and small boulders.

The Jesuit missionaries as early as 1636 mentioned the existence of copper in this region; their knowledge, however, was probably restricted to small pieces of copper found in the streams. The first actual attempts at mining in this region within historic times were made in 1791, by Alexander Henry, but it was not until about 1842 that active and successful operations were undertaken.

Previous to this period pits and small mounds of earth had been observed in the metalliferous region; but it was only in 1848 that these were discovered to be remains of ancient excavations connected with the mining of copper. After this fact was clearly ascertained, it was turned to a profitable account by modern explorers, who found that their predecessors had industriously ferreted out the rich lodes, and that copper was always to be found by the indications of the ancient "diggins," as these excavations are popularly called. The ground is mostly covered with a dense forest, and, in many cases, with fallen trees of a preceding growth, indicating a great lapse of time since the excavations were made. The present Indians of the region have no knowledge of the origin of these remains, or of the purpose with which they were connected. The implements employed by the ancient miners were those which European archæologists refer to what they call the stone age, and to the transition period denominated by them the bronze age. They consist of mauls and adzes of trap rock, and chisels of flint and of copper. Fire was not employed to melt the metal, but apparently to assist in disintegrating the rock. Levers of wood were used for elevating large masses, but with the implements mentioned the earth could only be penetrated to a short distance. For cutting wood, copper chisels and probably adzes and axes of the same metal were employed. The copper was hardened by hammering when cold, and not in any case by admixture with other metals. The primitive miners were unable to manage large masses, and consequently sought for lumps which could be readily beaten into the required shape.

The Lake Superior mining region does not appear to have been the place of permanent residence of a large number of tribes, for no

human remains or sepulchral mounds have been discovered, nor any evidence of the cultivation of the soil. From the extent of the works, and the difference in their apparent antiquity, it is probable that a large number of individuals were engaged, and during a long succession of years.

Miscellaneous Collections.—The Miscellaneous Collections include works intended to facilitate the study of the various branches of natural history, to give instruction as to the method of observing natural phenomena, and a variety of other matter connected with the progress of science. Although the object of the Institution is not educational, yet in carrying out the general plan it has been thought important in some cases to publish elementary treatises, which will not only furnish an introduction to special subjects to those who have not access to expensive libraries, but also serve to point out the way in which individuals by special studies can not only promote their own enjoyment, but also co-operate with all others engaged in the same pursuit in extending the domain of knowledge. The objects of nature, like the specimens of high art, are the luxuries of the cultivated mind, and the awakening of a taste for their study affords an inexhaustible source of pleasure and contentment to the most numerous and the most important classes of the community.

In accordance with this view it was stated in the last report that the following works were in preparation to introduce and facilitate the study of *conchology*, a branch of natural history not only interesting in itself, but also indispensable in the study of geology, as the ages and relative position of rocks are principally determined by the remains of this class of animals, which are found imbedded in their strata:

1st. Elementary introduction to the study of conchology, by P. P. Carpenter, of England.

2d. List of the species of shells collected by the United States exploring expedition, by the same author.

3d. Descriptive catalogue of the shells of the west coast of the United States, Mexico, and Central America, by the same author.

4th. Bibliography of North American conchology, by W. G. Binney.

5th. Descriptive catalogue of the air-breathing shells of North America, by the same author.

The first of these works was published as a part of the appendix to the report of the Regents for 1860, and, in order to meet the

special demand for the article, 1,000 extra copies were struck off in pamphlet form for separate distribution. To illustrate this work we have been promised by Dr. Gray, of London, a series of stereotype casts from the wood-cuts used in the British Museum catalogues. They were not received in time to be inserted in the report. We shall, however, distribute copies of them to all persons who have received the work in a separate form.

Mr. Carpenter, the author of these lectures, who is well known to the students in this branch of natural history, has presented in this work an account of the present condition of our knowledge of the molluscous animals, and completed a task which will go far to supply a want which has been experienced by all who have commenced the study of these objects. The only other popular introductory work on shells in the English language of a reliable and representative character, is Woodward's Manual of the Mollusca, from which it differs in some essential particulars, which better adapt it to the object intended. It includes an account of the extinct as well as the recent forms. The families and higher groups as well as the genera are necessarily very briefly characterized, but sufficiently so to enable the student, with perseverance and study, to identify the species and recognize their affinities. One of the best features of the work, and which will interest the accomplished naturalist as well as the elementary student, is a table of apparently similar shells belonging to different families or genera; or of shells whose general appearance is similar, but which, on account of more important characters, are separated into widely different genera. It is also proper to remark that the work is not confined to a description of the external covering of the animals, but also includes that of their soft parts.

The other numbers of the above-mentioned series of works on conchology are still in course of preparation, and will be published as soon as they are completed.

It was also mentioned in the last report that a series of articles was in preparation to facilitate and promote the study of the *entomology* of North America. This branch of general zoology is perhaps larger than that of all the other branches taken together. In order to illustrate this statement we may mention, on the authority of Baron Osten Sacken, to whom we are specially indebted for advice and direction in regard to the best means of promoting this object, that according to the most recent computations, the number of species of insects in all parts of the world, is believed to be rather above than below one

million five hundred thousand, a considerable portion of which there is reason to suppose may be found in North America. To collect, arrange, and study such a vast number of objects requires a corresponding number of co-laborers; but fortunately for the advance of entomology, wherever a taste for it has been awakened, its votaries outnumber those of almost any other branch of natural history. There is scarcely one, says Osten Sacken, which offers equal facilities to the student who prosecutes its study—scarcely one which is so apt to become a favorite with every class of persons; and there is none, even botany not excepted, in which the mere gratification of taste can be so well combined with real scientific usefulness. It is adapted to every condition of life, because the specimens take up very little space, and require but trifling expense in collecting them; to every degree of education, for the number of insects being inexhaustible, any schoolboy may make collections or observations of great value to the more scientific investigator; it can be combined with almost any other pursuit, and can at any time be laid aside to be resumed at a more favorable moment.

Advancement of knowledge, however, naturally precedes its diffusion; therefore, before attempting to awaken a taste for the pursuits of entomological studies, it was necessary to bring this branch of natural history, as far as it relates to this continent, to a greater degree of perfection than that to which it had attained. American entomology is in this respect, as we are informed, far behind American botany. The systematical knowledge of the plants indigenous to the settled parts of North America is almost brought to perfection, and excellent manuals have been prepared, making it comparatively easy, even for a beginner, to identify most of the plants he may find. Not so with entomology; by far the greater number of our insects are still undescribed. The publications on American entomology are scattered through a great number of scientific transactions, most of which are in foreign languages, and therefore inaccessible to the many who would otherwise be interested in the study.

The first object of the Institution was, therefore, to collect and present in a compact and condensed form the existing knowledge; next, to increase this knowledge by encouraging further research by scientific men, so as to bring this branch of science to a certain degree of completeness and of symmetry in its different parts, and not until after this was accomplished to attempt its general diffusion. This

plan has been strictly pursued in the successive entomological works undertaken for the Institution, as will appear from the following account.

1. Among all the orders of insects which are found on the continent of North America, the Coleoptera (beetles) were the best known, owing principally to the exertions of Dr. Le Conte, of Philadelphia. What was wanted as regards this order for popular purposes was less the *increase* of knowledge than the condensation above alluded to. This has been aimed at in two publications by the Institution, namely, Melsheimer's Catalogue of the Coleoptera of the United States, revised by Haldeman and Le Conte, and published in 1853, and the Classification of the Coleoptera of North America, by Dr. Le Conte. The first part of the latter appeared in 1861, and the second will be issued soon. The first of these works facilitated research by furnishing a list of all the described species, with references to the works or scientific transactions containing them. The second will give a thorough and detailed account of the systematical distribution of the Coleoptera of this country, and thus offer to the student a faithful delineation of the present state of the science, and to the beginner a welcome hand-book for its acquisition.

2. The Lepidoptera, (butterflies, moths, &c.,) have always been, like the Coleoptera, a favorite order of insects, and a considerable number of descriptions of North American species was scattered through various works, transactions, &c. It was decided, therefore, to issue first, a list of these species, with references, on the plan of Melsheimer's catalogue of Coleoptera; next, a republication in a compact form of all these descriptions in English. Both these works were prepared, at the suggestion of the Institution, by Dr. Morris, of Baltimore, and published, the one as a catalogue, in 1860, the other as a synopsis of the described Lepidoptera of North America, in 1861. The latter will save to the lepidopterist much trouble and expense, by giving him in one volume what he would have had to look for in more than fifty different publications.

3. The order of Neuroptera (dragon flies, may flies, lace-wings, &c.,) contains, comparatively, a small number of species, and for this reason it was possible to produce at once a more perfect and thorough work on this order than has yet been prepared on any other. The synopsis of the Neuroptera of North America, with a list of the South American species, published in 1861, was prepared, at the request of the Institution, by Dr. Hermann Hagen, of Königsberg, one of the

first contemporary authorities in this branch, and principally from materials furnished by or through the medium of the Institution. It contains the description of 716 North American and a list of 507 South American species. The plan of this publication is essentially different from that of the synopsis of Lepidoptera, the latter being a mere compilation of existing descriptions, whereas the greater part of the descriptions contained in the former were drawn by Dr. Hagen from specimens in his possession, and thus the necessary uniformity and accuracy have been secured. The original manuscript in Latin was translated into English and prepared for publication by Mr. Ph. R. Uhler, of Baltimore.

4. The order of Diptera, (flies, mosquitoes, &c.,) is known to be exceedingly numerous and of rather difficult study, as much on account of the minuteness and great fragility of most of the species as of a peculiar inconstancy and comparative slightness of the characters used for classification. In this case, as in preceding ones, the first work directed by the Institution was one of condensation, namely, the Catalogue of the described Diptera of North America, by Baron Osten Sacken. It was published in 1858, and includes a list of about 1,700 species, with references to ninety-five works and papers containing their descriptions, principally in foreign languages.

The next thing to be done was either to furnish a republication of all these descriptions, like that of the synopsis of Lepidoptera, or to attempt at once to prepare a monograph of the order. Owing to the large collections formed by Baron Osten Sacken during his residence in this country, the latter was possible. It was deemed advisable to put these collections into the hands of Dr. H. Loew, of Meseritz, Prussia, one of the most eminent dipterologists now living, who will prepare a series of monographs on the different families of this large order, to be published by the Smithsonian Institution. The first volume of this series is now in the press.

It may be proper here to call attention to the great importance of having the first foundation of a study laid by the most eminent authority. This is especially necessary in regard to the Diptera, since, as we are informed, this class of American insects contains a great number of species, closely allied to European species, and consequently requires an intimate knowledge of the latter to identify the former. Besides this, there are many insects of the same class in this country altogether different from those of Europe, which will require the formation of new genera, a work which can only be prop-

erly done by one intimately acquainted with the entire subject. Dr. Loew has found, for instance, that a genus (Paralimna Fab. Hydromysidae) occurring in North America, and foreign to Europe, had been also discovered in Africa, and previously described. Almost any one but Dr. Loew would have formed a *new* genus of this insect, and the interesting fact of the occurrence of the same genus in Africa and America, and not in Europe, would have been, for a time at least, unknown to science. Some other curious results have been obtained by this naturalist from the study of Baron Osten Sacken's collections. A species of *borborus*, from Cuba, has been found identical with an African species, and from the matter on which this fly occurs (alvine dejections) it is probable that it has been accidentally imported into that island by a slave ship. A still more interesting result is the discovery of the striking analogy between the present American and the fossil tertiary fauna, coinciding with the analogy of the corresponding floras. Dr. Loew having monographed the fossil Diptera preserved in Prussian amber, and having described no fewer than 656 of such species, was better able than any one else to trace this analogy. The remarkable fact appears from his investigation that insects, some of them very singular, which are absolutely extinct in Europe, are now found living in America.

Such have been, up to the present time, the entomological publications of the Smithsonian Institution. They do not as yet embrace the three orders of *Hemiptera*, *Orthoptera*, and *Hymenoptera*. Mr. Ph. R. Uhler, of Baltimore, who has for several years made the North American Hemiptera (tree bugs, plant lice, &c.,) the special subject of his study, is preparing for the Institution a work in regard to these insects on the same plan as that of Hagen's Neuroptera, which it is expected will be soon ready for publication.

Little has yet been done for the *Orthoptera*, (grasshoppers, rear horses, crickets, &c.,) although, owing to the small extent of this order, it would be a comparatively easy task to produce a work similar to the synopsis of Neuroptera, if a sufficient collection of specimens were in existence. The Institution has adopted measures to have this desideratum supplied. The study of North American *Hymenoptera* (bees, wasps, &c.,) was undertaken several years ago by Mr. H. de Saussure in Geneva, and large collections have been furnished to him by the Institution. It is expected that his manuscript will soon be furnished for publication.

In order to complete the series of the entomological publications of the Institution, a want of the intelligent public remains to be supplied, that of a popular work on Entomology in general, designed to serve as an introduction to this department of zoology, and to facilitate its acquisition by presenting its elements in an attractive form, while at the same time infusing the true philosophical spirit of the science. Such a work is in contemplation, and will promote more than any other the diffusion of this branch of knowledge.

Reports.—The next class of publications consists of the annual Reports to Congress. These reports, which are printed at the expense of the Government, consist each of an octavo volume, limited to 450 pages. They contain the report of the Secretary, the acts of the Regents, and an appendix, consisting of a synopsis of lectures delivered at the Institution, extracts from correspondence, and information of a character suited to the meteorological observers, teachers, and other persons especially interested in the promotion of knowledge. The appendix to the report for 1860 contained three lectures of a course on Roads and Bridges, by Prof. Fairman Rogers, the remainder of which will be given in the report for 1861 ; an extended series of lectures on Mollusca or Shell-fish, and their allies, by Philip P. Carpenter ; general views on Archæology, by A. Morlot, translated from the French ; a series of articles translated from foreign journals; and extracts from correspondence, principally on meteorology and natural history.

Of this report 10,000 extra copies were ordered by Congress, of which 4,000 were presented to the Institution for distribution among its special correspondents. The requests for this work have been constantly increasing, and the demand for back numbers to complete sets has been greater than the Institution could supply.

The following general rules for the distribution of these reports have been adopted:

1st. They are presented to all the meteorological observers who send records of the weather to the Institution.

2d. To the collaborators of the Institution.

3d. To donors to the museum or library.

4th. To colleges and educational establishments.

5th. To public libraries and literary and scientific societies.

6th. To teachers, or individuals who are engaged in special studies, and who make direct application for the volumes.

The additional distribution of copies of these reports by Congress serves still more widely to make known the character and operations of the Institution, and to diffuse a species of useful knowledge which cannot otherwise be readily obtained.

Ethnology.—From the previous reports it will have been seen that the Institution has endeavored to promote various branches of the science of ethnology. Besides the works on Indian Archæology, it has presented to the world several papers which relate to language. In the report for 1860 a list of original manuscripts was given, relating to the languages of the western coast of North America, which had been received through the assistance of Mr. Alexander S. Taylor, of Monterey, California. Several of these have been carefully copied, at the expense of the Institution, with the intention of insuring their preservation and their subsequent publication. It has been suggested that the publication of a grammar and dictionary of one at least of each of the representative languages of North America would much facilitate the investigation of the general relations of the several parts of this branch of ethnology. With a view to carrying out this suggestion, means have been adopted to obtain information as to all the manuscripts which may possibly exist; and we have been so fortunate as to enlist the co-operation, in this important work, of a number of valuable collaborators. Among these are Mr. Alexander S. Taylor, of California; the Catholic clergymen of the western coast of North America; Mr. George Gibbs, of Washington Territory; Mr. Buckingham Smith, late Secretary of Legation to Spain, and Mr. J. G. Shea, of New York.

Mr. Shea, who has devoted much attention to the subject of comparative philology, has commenced the publication at his own expense of a "Library of American Linguistics," which he is desirous of continuing as a labor of love; and since it would not be in accordance with the policy of this Institution to interfere with so praiseworthy an undertaking, but on the contrary to facilitate it by all the means in its power, it has been thought proper to present to Mr. Shea copies of all the collections which the Institution has yet made relative to this subject, and to purchase from him for distribution to learned societies a certain number of copies of all the works which he may publish. By adopting this course, which has been warmly recommended by some of the principal ethnologists of this country, more

service can be done in the way of advancing knowledge with the small appropriation which could be devoted to this purpose than by publishing the manuscripts, as was first intended, as a part of the Smithsonian Miscellaneous Collections. In accordance with this view, the grammar of the Mutsun language, mentioned in the last report, has been presented to Mr. Shea, and has been published by him as one of his series, full credit being given to the Institution in the title page, and in a separate advertisement.

The Mutsun Indians inhabited the country northwest of Monterey, California, comprising a district, according to Mr. Taylor, of 170 miles long by 80 broad, and are the most northerly tribe known of whose language the Spanish missionaries compiled a grammar. Their village lay in the centre of a valley which abounded in rich land, and as late as 1831 numbered twelve hundred souls. For the purpose of comparison this work therefore possesses great value. The late W. W. Turner says that this language is clearly the same as the Rumsen or Rumsien, one of the two spoken at the mission of San Carlos, and at the mission of La Soledad, further to the south. It also bears a considerable degree of resemblance to the language of the Costanos on the bay of San Francisco, and also a fainter one to other languages further north. The grammar is printed in superior style, on excellent paper, by J. Munsell, of Albany, and forms Part IV of the linguistic series above mentioned, the following being the titles of the three previous parts, viz:

1. A French Onondaga dictionary, from a manuscript of the 17th century.

2. A Selish or Flathead grammar, by Rev. Gregory Mengarini.

3. A grammatical sketch of the Hèvè language, spoken in the middle of the last century in Sonora; translated from an unpublished manuscript by Buckingham Smith.

Besides the fourth number, the other works which have been placed in the hands of Mr. Shea for publication are the Mutsun vocabulary, the Yakama grammar, and the Sextapay vocabulary. The paper on the languages of the western coast mentioned in the last report as in preparation by Mr. George Gibbs is still in progress. He has received several valuable additions of materials for comparison of the different languages under investigation.

The publication in the last report of the general views on archæology, by Morlot, of Switzerland, has awakened a new interest in the remains of Indian art found in all parts of the United States, and

various collections are now being formed, which will be of great interest in comparing analogous stages of the mental development of the primitive inhabitants of this country and those of Europe. For the purpose of assisting this comparison it is proposed to make photographic impressions of all type specimens which have been found in this country, to be distributed to the most distinguished archæologists in Europe, and to invite a general exchange of illustrations and articles of this character. Mr. Franklin Peale, of Philadelphia, has arranged with artistic skill, in thirty tablets, nearly a thousand specimens of arrow heads, hatchets, knives, chisels, and other instruments belonging to the stone period, and has ascertained by actual experiment that a photographic picture can be taken of each tablet of full size, which presents the form and peculiarities of each article with such distinctness that the impressions may serve almost as well as the specimens themselves for comparative study.

Meteorology.—The system of meteorological observations, organized and carried on successfully for several years past, has suffered more from the disturbed condition of the country than any other part of the operations of the Smithsonian establishment. But few records have been received since the commencement of the war from Virginia, Kentucky, and Missouri, and, with two or three exceptions, none from the States further south.

The withdrawal of the troops from the numerous stations along the coast of the Pacific and from the interior of the continent has materially diminished the number of observers reporting to the office of the Surgeon General.

The popular system of daily telegraphic reports of the condition of the weather from distant parts of the United States has been discontinued ; the continuity of the lines to the south having been interrupted, and the wires from the north and west being so entirely occupied by public business that no use of them could be obtained for scientific purposes.

We may mention in this connexion that a daily bulletin of telegrams relative to the weather in different parts of Europe, similar to that established by this Institution, is published at the Imperial Observatory at Paris, copies of which are regularly transmitted to us, through the kindness of the director, M. Le Verrier. From an examination of these records we find that the meteorological phenomena

of the temperate zone in the eastern hemisphere travel eastwardly, or in the same direction that they are observed to follow in the United States. The meteorologists, however, of London and Paris, are by no means as favorably situated for predicting the coming weather as those of Washington, New York, or Boston, since the storm which approaches the former comes from the ocean and admits of but very limited telegraphic announcement, while those which are coming toward the latter can be heralded over thousands of miles of wire.

We have continued to receive records of observations from the northern and western States, Canada, the Hudson's Bay Territory, Mexico, and Central America.

It was stated in the last report that on account of the suspension of the annual appropriation from the Patent Office for meteorological statistics the process of reduction had been discontinued, and we regret to say that we have not been able to resume this work during the past year. The reductions, however, prepared by Professor Coffin, under the direction and at the joint expense of the Smithsonian Institution and the Patent Office, for the years 1854–'59, inclusive, are still in the hands of the public printer. The work cannot be hurried through the press, since much labor and care are required for proper correction of the proof sheets; the delay, however, has been mainly caused by the interruptions incidental to the entire change of system of Congressional printing, and the establishment of a government printing office. The work will form two large quarto volumes, the first of which is completed, with the exception of some introductory matter, and contains 1,270 pages. It exhibits the monthly and annual reductions for the barometer, thermometer, psychrometer, and rain guage, the observations on winds, clouds, &c.

The following statement from this volume of the number of observers for the several years, shows the growth of the system:

1854,	embraces	234	stations.
1855,	"	217	"
1856,	"	320	"
1857,	"	379	"
1858,	"	390	"
1859,	"	531	"

The second volume, which is also partly printed, will probably contain as many pages as the first, and will give the observations on

periodical phenomena, such as the appearance and disappearance of birds and animals, first and last frosts, dates of the opening and closing of rivers, lakes, harbors, &c.; also, detailed observations for the investigation of the principal storms of 1859; general tables of temperatures of several hundred places in North America, deduced from a series of years from all the reliable sources which could be commanded; also, a series of tables of rain at different places, deduced from observations for a series of years. The special object of the extended table of temperature is to furnish the materials for a more accurate isothermal map of the United States than has as yet been projected; and that of the rain tables, to present the data for a more reliable map of the average precipitation in the different parts of the country.

The volume will also contain special thermometric observations at stations distributed over the area extending from the Arctic regions to the northern States of South America, and from the Pacific to the Atlantic coast, for the purpose of showing the progress of cold periods across the continent, from the Rocky mountains to Bermuda. The same volume will also contain daily notices of the weather for the year 1859, gathered from published accounts, presenting items of information in a general and popular form, which may assist in the investigation of the movement of storms, and be of more interest to the general reader than the tabular statements of the principal part of the work.

The office work of the system of meteorology has continued in charge of William Q. Force, esq., of this city, to whom has also been intrusted the laborious duty of correcting the proof sheets of the volumes above mentioned.

Magnetic Observatory.—It was stated in the last report that as the changes in the direction and intensity of the magnetic force at Toronto were almost precisely the same as at Washington, it was concluded that more important service could be rendered to science by separating the points of observation to a greater distance. In accordance with this view, the instruments of the observatory on the Smithsonian grounds were sent to Key West, one of the Tortugas, where the United States has a military post, and the Coast Survey a tidal station. This location has been found well adapted to the purpose, and notwithstanding its proximity to the seat of active war, the photographic registration has been uninterruptedly kept up during the

past year, at the joint expense of the Coast Survey and the Smithsonian Institution.

Laboratory.—The operations of the laboratory during the past year have been principally confined to the examination and classification of the minerals which have been collected at the Institution from the various exploring expeditions, preparatory to a general distribution of the duplicates. This work has been intrusted to Mr. Thomas Egleston, of New York.

Facilities have been given to Professor Way, of London, for the exhibition of his improved method of producing an intense light for signals by means of the electrical deflagration of a stream of mercury, and the Institution is indebted to this gentleman for the present of a set of apparatus for exhibiting this light, and also of a powerful galvanic battery. The apparatus of the laboratory has been increased by a large Daniell's battery, consisting of fifty cylindrical copper cells, each six inches in diameter and fourteen inches high, with appropriate zinc elements of pure metal, procured expressly for the purpose from Mr. Wharton, of Pennsylvania.

Among the experiments which have been made, may be mentioned a series by Dr. Craig, on the effects of the explosion of gunpowder under pressure ; and another by the Secretary, on the burning of the same substance in a vacuum, and in different gases.

A series of researches was also commenced to determine more accurately than has yet been done the expansion produced in a bar of iron at the moment of magnetization of the metal by means of a galvanic current. The opportunity was taken, with the consent of Professor Bache, of making these experiments with the delicate instruments which had previously been employed in determining the varying length under different temperatures of the measuring apparatus of the base lines of the United States Coast Survey.

It may also be stated that the Secretary was requested by the War Department to report upon the practicability of employing balloons for military purposes, and in accordance with this request the several plans proposed by Mr. Lowe, of Philadelphia, and Mr. Helme, of Providence, were examined and practically illustrated on the Smithsonian grounds.

It may not be improper in this connexion to state that a considerable portion of the time of the Secretary, during almost every year since the beginning of the Institution, has been devoted to investiga-

tions pertaining to the operations of the general government. For these services no compensation has been asked or received.

It is believed that the Institution, through its Secretary and other officers, has been the instrument of important services to the government, which have repaid in some degree the fostering care which the latter has bestowed on the former.

Explorations.—For the purpose of obtaining a large number of duplicate specimens of the Zoology, Botany, and Mineralogy of North America, the Institution has not only furnished instructions and rendered assistance, in the way of making collections, to the various government expeditions undertaken during the last twelve years, but it has also engaged the services of persons of the requisite acquirements to make independent explorations. An account of these explorations has been given in the several reports for previous years, and it is therefore only necessary to mention at this time those which have been completed during the past year, or are still in progress.

The exploration in Lower California, near Cape St. Lucas, the southern extremity of the peninsula, by Mr. John Xantus, has been completed. The labors expended in this field have been truly remarkable. According to the statement of Professor Baird, Mr. Xantus has sent to the Institution sixty large boxes filled with specimens illustrating almost every branch of natural history. His explorations were not confined to the southern extremity of the peninsula, but extended many leagues up the coast on both the ocean and gulf sides. He also visited Mazatlan, on the Mexican coast, and made a valuable collection of birds. The specimens which he collected contain a large number of species never before described. These have been submitted for study and examination to some of the principal naturalists in this country and Europe. In closing the accounts of the explorations in Lower California it is necessary to acknowledge the services rendered to the natural history of this country by the Coast Survey, under the direction of Professor Bache, in affording Mr. Xantus, while discharging the duty of tidal observer, the opportunity of making these valuable collections at points which would otherwise be almost inaccessible to the naturalist.

The explorations by Mr. Robert Kennicott, in the northwestern part of this continent, are still going on, the Hudson's Bay Company having extended the time and afforded additional means for the prosecution of the work. From the latest advices from Mr. Kennicott,

he had reached Fort Yukon, on the Yukon river, a post in Russian America, and in a region almost entirely unknown, not only in regard to its natural history but also as to its geography. From this point he intended to continue his explorations to the mouth of Anderson river, on the coast of the Arctic ocean, and to return home about the end of the year 1863. It is proper to remark that in defraying the expense of this exploration the Institution has been assisted by the University of Michigan, the Chicago Audubon Club, the Chicago Academy of Natural Sciences, and by several gentlemen interested in natural history, and that without the facilities afforded by the Hudson's Bay Company and its officers the enterprise, as at present extended, could not have been accomplished. Not only has Mr. Kennicott been received as a guest at the different posts, but free transportation has been afforded for himself and his collections. It is gratifying to the friends of this zealous and accomplished young naturalist to learn that he has everywhere succeeded in exciting the sympathy and awakening the interest of the officers and employés of the foreign governments through whose territories his explorations have extended. And, thus, while actively engaged himself in extending our knowledge of these remote regions, he has diffused a taste for natural history, and enlisted the services of a number of active collaborators.

The officers of the Hudson's Bay Company have instituted local explorations at the principal stations, which, taken in connexion with what Mr. Kennicott is doing, bid fair to make the natural history of Western Arctic America as well known as that of any part of the continent. Among the most active of those who have become voluntary collaborators of the Institution is Mr. Bernard R. Ross, chief factor of the Mackenzie river district. From that gentleman we are receiving, from time to time, valuable collections of specimens to illustrate the natural history and ethnology of the region in which he resides.

Another gentleman, Mr. Lawrence Clark, jr., of Fort Rae, has contributed largely to our collection of specimens from the vicinity of Slavé lake. Besides these, I must refer to the report of Professor Baird for the names of a number of other gentlemen who have made similar contributions from different parts of the Hudson's Bay territory, and other districts of North America.

Collections of Natural History, &c.—In the last report of the Institution, a distinction was made between the collections of natural his-

tory and the museum of the Institution; the object of the former being more essentially in accordance with the primary idea of the establishment, namely, the advance of science, and that of the latter a public exhibition of the natural history, principally of the North American continent, for popular as well as scientific study.

While it has not been contemplated to employ any large portion of the Smithsonian income in the support of a general museum, which, under the most favorable circumstances, must be, in a considerable degree, local in its influence, and can only produce its best effects when connected with an educational establishment, as in the case of the great museum now in process of being formed by Professor Agassiz at Cambridge, yet much labor and money have been expended in making the collections, with a view principally to obtain new materials for the investigation and illustration of the natural history, mineralogy, and geology of this country. As the primary object of the Institution is the advance of science, such a disposition of the specimens is sought to be made as will best secure this end.

The specimens may be divided into two classes—1st, those which have been described in the reports of government expeditions or the transactions of the Smithsonian and other Institutions; and 2d, those which have not been described, and which consequently are considered of much value by the naturalists who are interested in extending the several branches of natural history. Of both classes the Institution possesses a large number of duplicates, in the disposition of which some general principles should be kept constantly in view. After due consultation with naturalists, the following rules, which were presented in the last report, have been adopted relative to the *described* specimens :

First. To advance original science, the duplicate type specimens are to be distributed as widely as possible to scientific institutions in this country and abroad, in order that they may be used in identifying the species and genera which have been described.

Second. To promote education, as full sets as possible of general duplicates, properly labelled, are to be presented to colleges and other institutions of learning that profess to teach the principal branches of natural history.

Third. It must be distinctly understood that due credit is to be given to the Institution in the labelling of the specimens, and in all accounts which may be published of them, since such credit is not only

due to the name of Smithson, but also to the directors of the establishment, as vouchers to the world that they are faithfully carrying out the intention of the bequest.

Fourth. It may be proper, in the distribution to institutions abroad, as a general rule, to require, in case type specimens to illustrate species which have been described by foreign authors may be wanted for comparison or other uses in this country, that they be furnished at any time they may be required.

Fifth. In return for specimens which may be presented to colleges and other educational establishments, collections from localities in their vicinity, which may be desirable, shall be furnished when required.

In the disposition of the *undescribed* specimens of the collection, it is impossible to be governed by rules quite as definite as those which relate to the previous class, but the following considerations have been adopted as governing principles :

1. The original specimens ought not to be intrusted to inexperienced persons, or to those who have not given evidence of their ability properly to accomplish the task they have undertaken.

2. Preference should be given to those who are engaged in the laborious and difficult task of preparing complete monographs.

3. As it would be illiberal to restrict the use of the specimens, and confine the study of them to persons who can visit Washington, the investigator should be allowed to take them to his place of residence, and to retain them for a reasonable time.

4. The investigator must give assurance that he will prepare a set of type specimens for the Smithsonian museum, and will return all the duplicates, if required.

5. In any publication which may be made of the results of the investigation, full credit must be accorded to the Institution for the facilities which have been afforded.

At the last session of Congress an appropriation was made to assist in the general distribution of duplicate specimens, and this distribution has been carried on as efficiently as the laborious character of the work would allow. The mere distribution of the specimens among colleges and educational establishments in this country, without labels or descriptions, would be little better than scattering them to the winds; but to present them correctly named and described renders them important auxiliaries in the study of natural history, and indirectly in the advance of this branch of knowledge itself. But this

work requires a critical knowledge of each particular class of specimens, and consequently the co-operation of a number of experienced naturalists, each of acknowledged authority in his special department.

The assortment and labelling of the larger part of the shells is still in progress under Mr. Philip P. Carpenter, of Warrington, England, assisted by Dr. Alcock. Certain marine families have been sent to Professor Agassiz; a part of the fresh water shells has been named by Mr. Isaac Lea, of Philadelphia; another part by Mr. W. G. Binney, of New Jersey; another class of mollusks has been consigned to Mr. Busk, of England; and a third has been sent to Dr. Steenstrup, of Copenhagen.

The botanical collection is still in charge of Dr. Torrey, of New York, and Dr. Gray, of Cambridge.

The rocks and minerals have been partially labelled by Mr. Thomas Egleston, late a pupil of the School of Mines, Paris, who will probably finish the work during the present year.

The insects have been referred to Baron Osten Sacken, Dr. LeConte, Dr. Loew, Dr. Hagen, Dr. Morris, Dr. Clemens, Mr. Ulke, Mr. Uhler, and Mr. Edwards.

Certain classes of the mammalia have been examined by Dr. J. H. Slack and H. Allen, of Philadelphia; the birds by Mr. John Cassin, Mr. Elliott Coues, Dr. Bryant, and Mr. George N. Lawrence; the reptiles by Mr. E. D. Cope; the fishes by Mr. Alexander Agassiz, Mr. F. W. Putnam, Mr. Theodore Gill, and students of Professor Agassiz; the crustacea by Mr. Ordway and Mr. W. Stimpson; the radiata by Mr. Verrill and Mr. Stimpson; the fossils by Dr. Newberry, Mr. Meek, Dr. Hayden, and Dr. Gabb.

The whole of this part of the general business of the Institution has been, as heretofore, under the special charge of Professor Baird, to whose detailed report I would refer for a more particular account of these operations. From his report it will also be seen that the Institution has already distributed upwards of 80,000 specimens of natural history, and when it is recollected that each of these has been properly labelled and referred to printed lists, some idea of the amount of labor and time which has been expended on this work may be formed.

Type series of these specimens have been presented to the principal museums of Europe, and to the different societies for the promotion of natural history in this country. In every part, therefore,

of the civilized world, wherever natural history is cultivated, the name of the Institution has become familiar as a household word.

The distribution will be continued during the present year, provided no unforeseen event should occur to interrupt the operations now in progress.

Museum.—Considerable advance has been made during the year in improving the condition of the specimens for public exhibition in the museum. It is intended to label each article distinctly and accurately; but, although much labor has been expended on this work, it cannot be fully accomplished until all the specimens shall be thoroughly examined and properly described. A large number of additions has been made to the museum, and many imperfect specimens replaced by those of a better character.

During the past year Washington has been visited by a greater number of strangers than ever before since the commencement of its history. The museum has consequently been continually thronged with visitors, and has been a never-failing source of pleasure and instruction to the soldiers of the army of the United States quartered in this city or its vicinity. Encouragement has been given them to visit it as often as their duties would permit them to devote the time for this purpose.

Exchanges.—The system of exchanges has continued during the past year to be the principal means of communication between the scientific societies of the Old World and those of the New. As might have been expected, however, the number of copies of works sent abroad in 1861 was less than that of the previous year. The whole number of packages containing books, pamphlets, &c., sent abroad during the year was 1,099, containing, at least, 10,000 separate articles. The number of packages received in return, for societies in this country, exclusive of those for the Institution, was 1,406, which, on an average, would amount to upwards of 7,000 separate articles. During the same period there have been received by the Institution for its own library 2,886 books and other publications.

In return for the generous assistance the Institution has received in carrying on this system of exchange, it is proper to repeat what we have stated in previous reports, that the Cunard steamers between New York and Liverpool, the North German Lloyd between New York and Bremen, the Hudson's Bay Company, the Pacific Mail Steamship Company, and Panama Railroad Company, have carried

our packages free of cost on account of freight, and that the New York and Hamburg line has also generously rendered us a similar service. Adams' Express Company has transmitted our packages to and from different parts of the country at reduced rates. This appreciation of the objects of the Institution is as creditable to these companies as it is gratifying to the friends of the Institution.

Library.—Since the date of the last report the plan adopted in regard to the library has been steadily acted upon, namely: to obtain as perfect a series as possible of the transactions and proceedings of the learned societies which have existed, or now exist, in every part of the world. During the past year nearly 3,000 articles from societies abroad, and copies of nearly everything which has been published by societies in this country, in Canada, and South America, have been added to the list of scientific works previously in the library.

We have received no definite information since the date of the last report as to the progress which has been made, under the direction of the Royal Society, in the preparation of the classified index of all the papers contained in the transactions of learned societies, and in the scientific serials of different parts of the world. The work, however, is still going on, and will, without doubt, be completed as soon as so extensive an undertaking can be properly accomplished.

The second and concluding volume of the catalogue of zoological literature from 1750 to the present day, by J. Victor Carus, of Leipsic, which was mentioned in the last two reports, has been published; and we would again commend it to the patronage of naturalists as the best compilation which has yet appeared of the titles systematically arranged of isolated papers on zoology published in American as well as foreign journals.

Among the more important donations since the date of the last report are the following:

130 volumes from T. Einhorn, of Leipsic;
18 from the Institut de France;
27 from the Academy de Stanislas, Nancy;
13 from the Agronomical Society, of Poland;
21 from the Royal Swedish Society of Sciences;
11 from the Königlich Preussische Technische Bau-Deputation;
10 from Oberlausitzische Gesellschaft at Gorlitz;
30 from the University of Chile;
8 from the Imperial Printing Office, Vienna;

25 from the Royal Observatory, Greenwich;

33 from the Academy of Sciences, St. Petersburg;

and a valuable collection of works on natural history from one of the regents, General Joseph G. Totten, of the United States army.

Gallery of Art.—The Stanley collection of Indian portraits and scenes of Indian life, together with the Indian portraits received from the museum of the Patent Office, still continue to form an ethnological gallery of much interest to the numerous visitors of the Institution. The small appropriation which was previously made to repay Mr. Stanley for incidental expenses connected with this gallery has been continued during the past year. The application which Mr. Stanley has, for several years, made to Congress for the purchase of his gallery cannot be expected at this time to receive attention, although we hope that in a more favorable condition of the treasury an appropriation for the purpose will be granted.

The following are the additions which have been made to the collection of objects of art during the past year: A large marble bust of Pulaski on deposit; a colossal bust in plaster of Dr. Robert Hare. Another, of the same size, of Hon. George M. Dallas; also a bust of Thomas Jefferson, and another of Dr. E. K. Kane, all by purchase. They are original works of art, of considerable merit, by Henry D. Saunders.

Besides these, a series of busts in plaster, several valuable pieces of sculpture in marble, and a number of pictures, have been received from the museum at the Patent Office. Among the busts are the following: An excellent likeness of John Vaughan, for a long time librarian of the American Philosophical Society; one of Cuvier, the French naturalist; of Hon. Dixon H. Lewis, late member of Congress, remarkable for his immense bodily size; and of the Hon. Peter Force, of this city. Among the articles in marble are a full-sized medallion of Minerva from Pompeii, a half-size copy of the Apollo Belvidere, and two other half-size ancient statues, all of elaborate finish. Among the pictures is an original portrait of Washington by the elder Peale, painted immediately after the battle of Princeton. In addition to the foregoing, the collection has been increased by one hundred large engravings presented by Charles B. King, a well-known artist, who has resided many years in this city. These engravings are copies of celebrated pictures, and are illustrations of the style of some of the best masters of the art of engraving. They were to have been be-

queathed to the Institution, as Mr. King himself informed me, but he has lately concluded to present them before his death. A list of the engravings will be found in the appendix to the report of the present year, from which it will be seen that they form an interesting addition to the valuable collection of engravings already belonging to the Institution.

It was stated in the last report that, in accordance with the policy adopted by the Institution, it would be proper to co-operate with Mr. Corcoran in the liberal and generous enterprise he had undertaken of establishing a free gallery of art in the city of Washington, and to deposit in his collection the specimens which might belong to this establishment, due credit being given to the name of Smithson for all additions of this kind to the gallery in question. The condition of the country has, however, for the present interfered with the prosecution of the original design of Mr. Corcoran, and the large and elegant building which he has erected for carrying out his ideas is now occupied by the government as a depot for military stores.

Lectures.—On account of the uncertainty as to the amount of income of the Institution, and the distraction of the public mind in regard to the war, it has been thought advisable not to make any definite arrangements for the usual course of popular lectures during the season of 1861–'62. A few lecturers, however, have lately been engaged, and at least a partial course will be given.

As stated in previous reports, the lecture-room of the Institution is the most commodious apartment in the District of Columbia for public meetings, and frequent applications are made for its use for lectures and public assemblages not connected with the operations of the Institution. The use of the room has been freely allowed under the following conditions: First. That the object for which it was required should be of a benevolent character, or in some respects in accordance with the general operations of the establishment. Second. That subjects connected with sectarianism in religion, discussions in Congress, and partisan politics should be excluded. Third. That the actual expense of the gas and attendance should be defrayed by the parties who used the room.

The privileges granted with these restrictions, although, perhaps, of advantage to the city, have been found to be attended with unfavorable results to the Institution. At first the number of applicants was small, and principally confined to cases in which the

privilege could be granted without hesitation; the number has, however, been constantly increasing, and during the past half year there has scarcely been a day in which the favor has not been urgently solicited by some of those who flock to this city with plans and inventions by which, as it is asserted, the government and the public are to be greatly benefited. These applications are prompted not only by the consideration that the use of the room may be obtained without charge, but also by the desire to connect the name of the Institution with the schemes or doctrines with which the public are to be impressed.

Since the custom was first introduced of granting the use of the room for the purposes before mentioned, a large amount of valuable property has been accumulated in the building, which is especially exposed at night to injury and loss from fire and other causes. On this account, as well as that of the insulated and exposed position of the grounds, an extra corps of watchmen is required for the protection of the property every time the building is open at night for public purposes.

Again, it has been found a disagreeable matter to allow, even for benevolent purposes, a charge to be made by other parties for entrance to the building while, in accordance with the policy of the Institution, admittance is free to every one.

But the greatest difficulty which has been met with in regard to granting the use of the lecture room for other purposes than those of the Institution, is that of strictly enforcing the rules relative to the discussion of political and sectarian subjects, and the consequent impossibility of preventing the name of the Institution from being associated in the mind of the public with topics alike foreign to its peaceful character and its scientific reputation. It is in vain to disclaim the connexion of the Institution with the discussion of these subjects. The popular mind, particularly at a distance, cannot discriminate between the lectures given under the sanction of the Institution and those which are simply permitted to be delivered within its building.

In view of these facts it becomes a matter of grave deliberation whether or not the use of the lecture room ought to be granted for purposes not connected with the operations of the Institution; but, under existing circumstances, perhaps the subject had better be postponed for future consideration.

Respectfully submitted,

JOSEPH HENRY, *Secretary.*

APPENDIX TO THE REPORT OF THE SECRETARY.

SMITHSONIAN INSTITUTION,
Washington, December 31, 1861.

SIR: I have the honor herewith to present a report for 1861 of the operations intrusted to my charge, namely: those which relate to the printing, the exchanges, and the collections of natural history.

Very respectfully, your obedient servant,

SPENCER F. BAIRD,
Assistant Secretary Smithsonian Institution.

Prof. JOSEPH HENRY, L.L. D.,
Secretary Smithsonian Institution.

PRINTING.

The publications of the past year have consisted principally of works belonging to the octavo series of Smithsonian miscellaneous collections and reports, and they amount to about 1,400 pages.

EXCHANGES AND TRANSPORTATION.

As might have been expected, the operations in this department show a decrease in magnitude as compared with 1860. That year, however, was an exceptional one, and the receipts of 1861, though inferior to those of 1860, are yet equal to the average of preceding years. Many works of great value have been added to the library of the Institution, and numerous series of foreign transactions completed to date. The transmissions of books and pamphlets on behalf of American institutions has been very large, and the returns of corresponding magnitude.

It will be observed by the annexed table that the Smithsonian Institution is not only the medium of literary and scientific communication between the Old World and parties in the United States, but performs the same office for all the principal institutions in the remaining countries of America, as Canada, Cuba, Mexico, Chile, Brazil, New Granada, &c.

In 1861, as in previous years, very important services have been rendered by various transportation companies in the reduction or remission of freights. Among these may be mentioned from previous years the Pacific Mail Steamship Company, the Panama Railroad Company, the Cunard steamers, the Bremen or North German Lloyd, the Hudson's Bay Company, the Adams Express Company, &c. During the past year the directors of the New York and Hamburg

line have also authorized their agents to forward packages to or from the Institution free of charge.

The Institution is under many obligations to Mr. A. B. Forbes and Mr. Samuel Hubbard, of the Pacific Mail Steamship Company, in San Francisco, for important services in facilitating and conducting its general business of exchanges, shipments, &c., on the Pacific coast.

The domestic agents of exchange, consisting of Messrs. Swan, Brewer & Tileston, Boston; D. Appleton & Co., New York; J. B. Lippincott & Co., Philadelphia, and Robert Clarke & Co., Cincinnati, have, as heretofore, received and distributed without charge the copies of Smithsonian contributions to knowledge addressed to institutions within their reach.

A.

Receipt of books, &c., by exchange in 1861.

Volumes:		
Octavo		572
Quarto		196
Folio		53
		821
Parts of volumes and pamphlets:		
Octavo	1,255	
Quarto	583	
Folio	107	
		1,945
Maps and charts		120
Total		2,886

B.

Table showing the statistics of the foreign exchanges of the Smithsonian Institution in 1861.

Agent and country.	Number of addresses.	Number of packages.	Number of boxes.	Bulk of boxes in cubic feet.	Weight of boxes in pounds.
1. Dr. Felix Flügel, *Leipsic.*					
Sweden	13	26			
Norway	6	11			
Denmark	10	16			
Russia	29	46			
Holland	25	45			
Germany	232	342			
Switzerland	21	34			
Belgium	11	21			
	347	541	30	278	7,840

B.—*Table showing the statistics of the foreign exchanges, &c.*—Continued.

Agent and country.	Number of addresses.	Number of packages.	Number of boxes.	Bulk of boxes in cubic feet.	Weight of boxes in pounds.
2. HECTOR BOSSANGE & SONS, *Paris.*					
France	69	129	------	------	------
Italy	39	64	------	------	------
Spain	5	9	------	------	------
Portugal	2	4	------	------	------
	115	206	7	94	2,588
3. ROYAL SOCIETY, *London.*					
Great Britain and Ireland	151	205	6	73	2,030
4. *Rest of the world*	52	147	30	180	4,500
Total	665	1,099	73	625	16,958

N. B.—The total number of volumes in these 1,099 packages amounts to about 10,000.

C.

Addressed packages received by the Smithsonian Institution from parties in America for foreign distribution in 1861.

	Number of packages.
Albany, N. Y.—	
New York State Agricultural Society	10
Boston, Mass.—	
American Academy of Arts and Sciences	118
Boston Society of Natural History	64
Prof. Jules Marcou	20
Cambridge, Mass.—	
American Association for Advancement of Science	53
Prof. A. Gray	27
Chicago, Ill.—	
Lieut. Col. James D. Graham, U. S. A	907
Columbus, Ohio.—	
Ohio State Board of Agriculture	100
Leo Lesquereaux	50
Dorchester, Mass.—	
Dr. Ed. Jarvis	25

	Number of packages.
Indianapolis, Ind.—	
Institution for Deaf and Dumb	18
New Haven, Conn.—	
American Journal of Science	104
Prof. G. J. Brush	4
Little Rock, Ark.—	
State of Arkansas	800
New York.—	
New York Lyceum of Natural History	68
Astor Library	6
Charles B. Norton	500
Philadelphia, Pa.—	
Academy of Natural Sciences	173
American Philosophical Society	119
Entomological Society of Philadelphia	12
Princeton, N. J.—	
Prof. Arnold Guyot	12
Providence, R. I.—	
State of Rhode Island	6
St. Louis, Mo.—	
St. Louis Academy of Sciences	163
San Francisco, Cal.—	
California Academy of Natural Sciences	50
Toronto, Canada.—	
Canadian Institute	5
Washington, D. C.—	
U. S. Patent Office	20
U. S. Coast Survey	69
Secretary of War	120
Captain A. A. Humphreys	24
	3,627

D.

Addressed packages received by the Smithsonian Institution from Europe, for distribution in America, in 1861.

	Number of packages.
Albany, N. Y.	
Albany Institute	2
Dudley Observatory	3
New York State Agricultural Society	7
New York State Library	2
New York State Medical Society	1
Dr. Brunnow	1
Professor James Hall	8
Amherst, Mass.	
Amherst College	4
Annapolis, Md.	
State Library	2
Ann Arbor, Mich.	
Observatory	5
Professor Brunnow	1
Augusta, Me.	
State Library	2
Austin, Texas.	
State Library	2
Baltimore, Md.	
Maryland Historical Society	5
Snowdon Piggot	1
Baton Rouge, La.	
State Library	2
Bogota, New Granada.	
Sociedad de Naturalistas Neo Granadinos	3
Sociedad Economica de Amigos del Pais	1
Boston, Mass.	
American Academy of Arts and Sciences	63
American Statistical Association	7
American Unitarian Association	1
Boston Society of Natural History	54
Boston, Mass.—Continued.	
Bowditch Library	1
Geological Survey	2
Massachusetts Historical Society	2
New England Historic-Genealogical Society	1
Prison Discipline Society	1
Public Library	8
State Library	6
James Barnard	1
M. Girard	2
Edward Habich	1
Dr. E. Jarvis	3
Professor C. T. Jackson	2
Professor Jules Marcou	2
Professor Moreland and F. Minot	1
Professor W. B. Rogers	2
Geo. Ticknor	1
Brookline, Mass.	
Dr. Lyman	2
Brooklyn, N. Y.	
Dr. Louis Bauer	1
E. Nugent	1
Brunswick, Me.	
Bowdoin College	3
Historical Society of Maine	1
A. S. Packard	2
Burlington, Iowa.	
Iowa Historical and Geological Institute	1
Burlington, Vt.	
University of Vermont	4
Cambridge, Mass.	
American Association for Advancement of Science	14
Astronomical Journal	3
Astronomical Observatory	13
Harvard College	15
Nautical Almanac Office	1
Professor L. Agassiz	25

D.—*Addressed packages received by the Smithsonian Institution, &c.*—Continued.

	Number of packages.
Cambridge, Mass.—Continued.	
G. P. Bond	3
Professor Clark	1
Dr. B. A. Gould	10
Professor Asa Gray	11
Professor Pierce	5
F. W. Putnam	1
J. D. Runkle	1
Ernest Schubert	1
Mr. Sullivan	1
Dr. Tuckerman	1
A. E. Verrill	1
Professor J. E. Worcester	6
Charleston, S. C.	
Elliott Society of Natural History	14
Society Library	3
Dr. C. Happoldt	1
Professor J. E. Holbrook	1
Wilmot De Saussure	1
Charlottesville, Va.	
University of Virginia	4
Chicago, Ill.	
Academy of Chicago	1
Chicago Historical Society	1
Mechanics' Institute	4
Messrs. N. S. David and Byford	1
Colonel J. D. Graham	1
Cincinnati, Ohio.	
American Medical College	1
Historical and Philosophical Society of Ohio	2
Mercantile Library	4
Observatory	3
Professor Mitchell	1
Dr. Newton	1
Columbia, Penn.	
S. S. Haldeman	1
Columbia, S. C.	
South Carolina College	4
State Library	2
Columbus, Ohio.	
Ohio State Agricultural Society	25
State Library	3
Leo Lesquereux	1
Concord, N. H.	
New Hampshire Historical Society	4
State Library	2
Des Moines, Iowa.	
State Library	9
Detroit, Mich.	
Michigan State Agricultural Society	9
Messrs. Palmer, Gunn & Stearns	1
Dr. Zena Pitcher and A. B. Palmer	1
Dorchester, Mass.	
Dr. E. Jarvis	1
East Greenwich, N. Y.	
Asa Fitch	1
Frankfort, Ky.	
Geological Survey of Kentucky	5
State Library	2
Gambier, Ohio.	
Kenyon College	4
Georgetown, D. C.	
Georgetown College	8
Arthur Schott	2
Hanover, N. H.	
Dartmouth College	5
Professor Young	1
Harrisburg, Penn.	
State Library	4
Hartford, Conn.	
Historical Society of Connecticut	2
State Library	3
Young Men's Institute	3
Havana, Cuba.	
Meteorological Observatory	1

D.—*Addressed packages received by the Smithsonian Institution, &c.*—Continued.

	Number of packages.
Hudson, Ohio.	
Western Reserve College	5
Indianapolis, Ind.	
Indiana Historical Society	1
State Library	3
Iowa City, Iowa.	
State University	29
Jackson, Miss.	
State Library	2
Janesville, Wis.	
State Institution for the Blind	1
Jefferson City, Mo.	
State Library	2
Lansing, Mich.	
Michigan State Agricultural Society	4
State Library	3
Lecompton, Kansas.	
State Library	2
Little Rock, Ark.	
State of Arkansas	9
State Library	3
University of Arkansas	3
Louisville, Ky.	
Dr. Shotz	1
Professor J. L. Smith	1
Madison, Wis.	
Historical Society of Wisconsin	7
State Library	3
Wisconsin State Agricultural Society	17
McMinnville, Warren county, Tenn.	
C. F. Falconnet	1
Mexico, Mexico.	
Sociedad Mexicana de Geografia y Estadistica	2
Milledgeville, Ga.	
State Library	1
Montgomery, Ala.	
State Library	2
Montpelier, Vt.	
Historical and Antiquarian Society of Vermont	1
State Library	3
Montreal, C. E.	
Natural History Society	1
Professor T. S. Hunt	1
Sir W. E. Logan	1
Nashville, Tenn.	
State Library	3
Professor Blackie	1
New Brunswick, N. J.	
Professor George H. Cook	5
New Haven, Conn.	
American Journal of Science	24
American Oriental Society	10
Yale College	13
Professor J. D. Dana	24
Professor E. Loomis	6
Professor Silliman	15
Professor W. D. Whitney	5
New Orleans, La.	
New Orleans Academy of Natural Sciences	25
Dr. Bennet Dowler	1
New York, N. Y.	
American Ethnological Society	2
American Geographical and Statistical Society	38
American Institute	5
Astor Library	3
Board of Education	1
Historical Society	3
Mercantile Library Association	4
New York Journal of Pharmacy	1
New York Lyceum of Natural History	39
Norton's Literary Gazette	2

D.—Addressed packages received by the Smithsonian Institution, &c.—Continued.

	Number of packages.
New York, N. Y.—Continued.	
University Library	6
J. Russell Bradford	1
W. Dornbach	1
Dr. Daniel Eaton	2
David Dudley Field	1
Messrs. Frank & Norton	1
Henry Grinnell	5
M. Harlan	1
J. P. Humaston	1
Hon. William Marvin	1
Professor Redfield	1
Dr. E. Robinson	1
E. G. Squier	2
Dr. John Torrey	2
Olympia, Washington.	
Territorial Library	2
Omaha, Nebraska.	
Territorial Library	2
Philadelphia, Penn.	
Academy of Natural Sciences	77
American Philosophical Society	50
Central High School	1
Franklin Institute	1
Geological Survey	2
Historical Society of Pennsylvania	4
Philadelphia Library Company	3
Wagner Free Institute	5
W. G. Binney	1
Mr. Cope	1
H. S. Cranner	1
Dr. Robley Dunglison	1
Messrs. Gross & Richardson	1
Professor Haldeman	1
Isaac I. Hayes	1
Isaac Lea	8
Dr. John L. Leconte	2
Dr. Joseph Leidy	10
William Sharswood	5
Professor Wagner	1
Portland, Me.	
Neal Dow, Mayor of Portland	2
Princeton, N. J.	
College of New Jersey	1
Professor Alexander	1
Professor A. Guyot	2
Providence, R. I.	
Brown University	4
Rhode Island Historical Society	2
State Library	1
John Carter Brown	1
Quebec, C. E.	
Observatory	2
Quincy, Ill.	
Dr. John Ritter	1
Raleigh, N. C.	
State Library	2
Richmond, Va.	
Historical Society of Virginia	2
State Library	2
Rio Janeiro, Brazil.	
Inst. Hist. Geogr. of Brazil	3
Nautical Observatory	1
Rock Island, Ill.	
Benjamin D. Walsh	1
Sacramento, Cal.	
State Library	1
St. Augustine, Fla.	
Historical Society of Florida	1
St. John's, N. B.	
King's College	1
St. Louis, Mo.	
Geological Survey of Missouri, (Columbia, Mo)	5
St. Louis Academy of Sciences	56
University Library	4
Dr. George Bemays	1
Dr. George Engelmann	4
Messrs. Eginton & McPheeters	1
Dr. Adam Hammer	2
Mr. Leslie	1
Dr. S. Pollak	1
Dr. B. F. Shumard	3

D.—Addressed packages received by the Smithsonian Institution, &c.—Continued.

	Number of packages.
St. Paul, Minn.	
Historical Society of St. Paul	1
State Library	1
Salem, Mass.	
Essex Institute	2
Professor King	1
Professor Russell	1
San Francisco, Cal.	
California Academy of Natural Sciences.	10
Santiago, Chile.	
Observatorio Nacional de Santiago	2
University Library	4
Professor Lobeck	1
Dr. Moestas	2
Savannah, Ga.	
Georgia Historical Society	2
Springfield, Ill.	
State Library	2
Rev. Prof. Esbjörn	1
Rev. Fachtmann	1
Springfield, Mass.	
William Tully	1
Toronto, C. W.	
Canadian Institute	1
Magnetical and Meteorological Observatory	2
Trinity College	1
Professor Kingston	1
Trenton, N. J.	
Geological Survey of New Jersey	1
State Library	2
Utica, N. Y.	
American Journal of Insanity	4
Valdivia, Chile.	
Dr. Eugen Von Boeck	1
Valparaiso, Chile.	
Dr. Thomas A Reid	2
Washington, D. C.	
Congress Library	6
National Institute	2
National Observatory	45
Ordnance Bureau	3
Secretary of War	2
U. S. Boundary Commission	1
U. S. Coast Survey	10
U. S. Patent Office	67
Colonel J. S. Abert	1
Professor A. D. Bache	25
W. P. Brown	1
J. Ferguson	1
Lieutenant Gilliss	6
Dr. Charles Girard	2
Captain H. J. Hartstene	4
Professor W. E. Jillson	1
J. C. G. Kennedy	4
Lieutenant M. F. Maury	9
Baron Osten Sacken	1
George W. Riggs	3
M. A. L. Rives	1
John A. Rockwell	1
H. R. Schoolcraft	8
W. Stimpson	1
Henry Ulke	1
West Point, N. Y.	
U. S. Military Academy	1
Professor Bailey	1
Major Bowman	1
Worcester, Mass.	
American Antiquarian Society	7

Total of addresses	274
Total of parcels	1,406

MUSEUM AND COLLECTIONS.

Additions.—The receipts of specimens during 1861, as might have been expected, were decidedly inferior to those of 1860, although much of great interest to science has been added to the collection since the date of the last report. Several explorations which had been planned were, of necessity, abandoned, owing to various impediments and difficulties. Among these may be mentioned an exploration of the region about Devil's river, Texas, by Patrick Duffy, hospital steward, United States army ; of Fort Churchill, by Lieutenant John Feilner, United States army; and of Lake Winnepeg, by Donald Gunn. These, it is hoped, however, are only deferred to be hereafter resumed and carried out under better auspices.

No government expeditions have furnished any collections during 1861, excepting the Northwestern Boundary Commission, and their collections were all made in 1860, only arriving in 1861. All the rest were derived from resident correspondents of the Institution, or from gentlemen making explorations in the field in its behalf. A full list of all such receipts is given herewith, to which I would refer for particulars.

In addition to the operations of Mr. Xantus, Mr. Kennicott, and officers of the Hudson's Bay Company, mentioned specially hereafter, I may state that important contributions to our knowledge of the regions adjacent to the United States have been furnished by Mr. Charles Wright, from Cuba; Mr. W. Thomas March, of Jamaica, and Dr. Sartorius, of Mexico.

Very valuable collections of type specimens have been received from Dr. Hartlaub, of the Bremen museum ; Drs. Reinhardt and Steenstrup, of the Copenhagen museum; Mr. P. L. Sclater, of London; the Messrs. Verreaux, of Paris; and Professor Agassiz, of the Cambridge museum.

The following are the explorations during the year from which the largest results have been received:

EXPLORATIONS.

Exploration of Cape St. Lucas and the Gulf of California, by Mr. John Xantus.—In the two last reports reference was made to that exploration following one of the region about Fort Tejon, California, by the same gentleman. I have now to report that the series of tidal and other observations made for the Coast Survey having been completed by Mr. Xantus, he has left Cape St. Lucas and returned to the east. The whole of the collections made by him have not yet arrived, but enough has been received during 1861, in continuation of previous years, to exhibit the ability and industry of Mr. Xantus as a naturalist. Over sixty boxes, some of large size, with contents embracing (and almost exhausting) every department of natural history, prepared and packed in a perfect manner, accompanied by numerous measurements, notes, and biographies, and all made in the intervals

of regular scientific duty, abundantly verify this estimate of Mr. Xantus's abilities.

In addition to the thorough exploration of the region immediately round Cape St. Lucas and the mountains in the vicinity, Mr. Xantus, since his residence there, has pushed his examinations many leagues up the coast, both on the ocean and gulf sides, and directly or indirectly extended them to a number of the islands, as Socorro, Tres Marias, &c. He also made a visit to Mazatlan during the past spring, and secured a valuable collection of birds.

The many new species collected by Mr. Xantus are in process of elaboration and will shortly be published. Partial reports have already been made on the birds by Mr. Xantus himself; on the reptiles by Mr. Cope; on the fishes by Mr. Gill; on the insects by Dr. Le Conte; on the crustacea and asteriadæ by Mr. Stimpson; on the ophiuridæ by Mr. Lyman; on the myriapoda by Mr. Wood; on the bats by Dr. Allen; on the plants by Dr. Gray, &c. The rich conchological materials are in the hands of Mr. P. P. Carpenter. It is proposed when all these examinations are completed to combine them in one general memoir, on the natural history of the cape, which will then be as well or even better known than the extremity of the corresponding peninsula of Florida, equally included in the limits of the North American fauna and flora.

Exploration of the Hudson's Bay territory by Mr. Kennicott.—At the date of the last advices from Mr. Kennicott, when the Smithsonian Report for 1860 was presented, he was at Fort Resolution, on Slave lake, where he had spent the preceding spring and summer, principally in collecting eggs of birds. He left Fort Resolution in August, 1860, and returned to Fort Simpson and proceeded immediately down the Mackenzie to Peels river. From Peels river he crossed the Rocky mountains to La Pierre's house, occupying four days in the transit, and arriving September 18th; left the next day for Fort Yukon, at the junction of Porcupine or Rat river and the Yukon or Pelly river, in about latitude 65° and longitude 146°. Fort Yukon, the terminus of his journey, was reached on the 28th of September, 1860.

The latest advices now on file from Mr. Kennicott were written January 2, 1861, up to which time he had made some interesting collections; but these, of course, were limited by the season. He had great expectations of success during the following spring, (of 1861,) which have no doubt been abundantly realized.

No collections were received from Mr. Kennicott in 1861, with the exception of a few specimens gathered in July and August, 1860, on Slave lake. Those made at the Yukon will, however, in all probability come to hand in October or November of 1862.

Mr. Kennicott expected to remain at the Yukon until August, 1861, then to start for La Pierre House and Fort Good Hope, possibly to Fort Simpson, to spend some months, and endeavor by early spring to reach Fort Anderson, near the mouth of Anderson river, (a stream between the Mackenzie and Coppermine rivers,) and in the barren grounds close to the Arctic ocean. At Fort Anderson he expected to

collect largely of the skins and eggs of birds, rare mammals, &c., and to return to Fort Simpson in the autumn, (of 1862,) then to arrive at Fort Chipewyan, on Lake Athabasca, by the spring of 1863, so as to get back to the United States by the winter of the same year.

For a notice of the continued aid to Mr. Kennicott, rendered by the gentlemen of the Hudson's Bay Company, I have to refer to the next division of my report.

Exploration of the Hudson's Bay territory by officers of the Hudson's Bay Company.—The gentlemen of many of the Hudson Bay Company's posts have largely extended their important contributions to science, referred to in the preceding report. A large proportion of the principal stations have thus furnished collections of specimens and meteorological observations of the highest value, which, taken in connexion with what Mr. Kennicott is doing, bid fair to make the Arctic natural history and physical geography of America as well known as that of the United States.

Pre-eminent among these valued collaborators of the Institution is Mr. Bernard R. Ross, chief factor of the Mackenzie River district, and resident at Fort Simpson. Reference was made in former reports to his contributions in previous years; those sent in 1861 are in no way behind the others, embracing numbers of skins of birds and mammals, some of great variety, insects, &c., besides very large series of specimens illustrating the manners and customs of the Esquimaux and various Indian tribes. Mr. Ross has also deposited some relics of Sir John Franklin, consisting of a gun used by him in his first expedition, and a sword belonging to the last one, and obtained from the Esquimaux. Mr. Ross is at present engaged in a series of investigations upon the tribes of the north, to be published whenever sufficiently complete, and illustrated by numerous photographic drawings.

In making up his transmissions to the Institution Mr. Ross has had the co-operation of nearly all the gentlemen resident at the different posts in his district, their contributions being of great value. Among them may be mentioned Mr. James Lockhart, Mr. William Hardisty, Mr. J. S. Onion, Mr. John Reed, Mr. N. Taylor, Mr. C. P. Gaudet, Mr. James Flett, Mr. A. McKenzie, Mr. A. Beaulieu, &c.

Second in magnitude only to those of Mr. Ross are the contributions of Mr. Lawrence Clarke, jr., of Fort Rae, on Slave lake, consisting of many mammals, nearly complete sets of the water fowl, and other birds of the north side of the lake, with the eggs of many of them, such as the black-throated diver, the trumpeter swan, &c.

Other contributions have been received from Mr. R. Campbell, of Athabasca; Mr. James McKenzie, of Moose Factory; Mr. Gladmon, of Rupert House; Mr. James Anderson, (a) of Mingan; Mr. George Barnston, of Lake Superior; and Mr. Connolly, of Rigolette. Mr. McKenzie furnished a large box of birds of Hudson's Bay, while from Mr. Barnston were received several collections of skins, and eggs of birds, new and rare mammals, insects, fish, &c., of Lake Superior.

It may be proper to state in this connexion that the labors of Mr.

Kennicott have been facilitated to the highest degree by the liberality of the Hudson's Bay Company, as exercised by the directors in London, the executive officers in Montreal, (especially Mr. Edward Hopkins,) and all the gentlemen of the company, in particular by Governor Mactavish, of Fort Garry, and Mr. Ross. In fact, without this aid the expense of Mr. Kennicott's exploration would be far beyond what the Institution could afford, even with the assistance received from others. Wherever the rules of the company would admit, no charge has been made for transportation of Mr. Kennicott and his supplies and collections, and he has been entertained as a guest wherever he has gone. No charge also was made on the collection sent from Moose Factory to London by the company's ship, and in every possible way this time-honored company has shown itself friendly and co-operative in the highest degree to the scientific objects of the Institution.

Northwest Boundary Survey, under Mr. Archibald Campbell.—This expedition has finally completed its labors in the field and returned to Washington, bringing rich results in physical science, as well as important collections in natural history. These, with what were previously sent hither from time to time, are in progress of elaboration, and reports are in preparation to be presented to Congress when completed.

It is with deep regret that I have to announce the death at sea, on his homeward voyage in February last, of Dr. C. B. Kennerly, the surgeon and naturalist of the Boundary Survey. Connected with this expedition from its beginning, in 1857, and, in conjunction with Mr. Gibbs, making the principal portion of its collections, his report on them would have been one of great value. For many years prior to 1857, however, he had been in intimate relations with the Institution as a collaborator, first while resident at his home, at White Post, Clark county, Virginia, then in 1853, as surgeon and naturalist to the Pacific Railroad Survey of Captain Whipple along the 35th parallel, then in the same relationship to the Mexican Boundary Survey, under Colonel Emory, in 1855. No one of the gentlemen who have labored so zealously to extend a knowledge of the natural history of the west within the last ten or twelve years has been more successful than Dr. Kennerly. Many new species have been first described by himself or from his collections, while his contributions to the biography of American animals have been of the highest interest.

IDENTIFICATION OF SPECIMENS.

The identification of the unnamed species in the Smithsonian collection has been carried on as rapidly as possible, with the co-operation of many naturalists of distinction. Some of it has been prosecuted within the building; most of it, however, by gentlemen who either came to Washington and made their selections or had specimens sent to them. The following persons may be specially mentioned in connexion with the several portions of the collection:

Mammals.—The monkeys and South American mammals generally have been studied by Dr. J. H. Slack, and the bats by Dr. H. Allen, both of Philadelphia. Several species not previously described have been found among them by these gentlemen.

Birds.—Mr. Cassin has continued his examinations of the South American birds. Mr. Elliot Coues has monographed the North American *Tringeæ*, or sandpipers; the *Laridæ*, or gulls; the *Colymbidæ*, or divers, and the *Aegiothi*, or pine finches. Several of these have already been published. Dr. Bryant has examined the *Guillemots* and large hawks, and Mr. Lawrence has identified the humming-birds.

Reptiles.—Mr. E. D. Cope has studied the exotic reptiles generally, and has had special reference to those from South America, Mexico, and the West Indies. Many new species have been described by him from the Smithsonian specimens. Professor Agassiz has not yet returned the Smithsonian collection of turtles.

Fishes.—Professor Agassiz has still in hand the Exploring Expedition fishes, a collection of nearly one thousand species. Mr. Alexander Agassiz has examined the Smithsonian *Embiotocoids*, or viviparous fishes of California. Mr. F. W. Putnam has completed the study of the *Etheostomoids*, and entered on that of the *Cottoids*. Several other important families have been sent to the Museum of Comparative Zoology, for investigation by students of Professor Agassiz. Mr. Gill has made particular study of the west coast fishes, and those collected at Cape St. Lucas by Mr. Xantus.

Crustacea.—Mr. Ordway has examined several groups of the crustacea, and others have been studied by Mr. Stimpson.

Radiates.—Mr. Stimpson has finished the study of the *Asteriades*, and Professor Agassiz has had in hand other of the star fishes. Mr. Verrill has made a detailed examination of all the corals.

Mollusks.—Mr. P. P. Carpenter has had in his hands for investigation, aided by Dr. Alcock, all the shells of the west coast of America, and many of the exotic collections. Certain marine families have been sent to Professor Agassiz. Mr. Isaac Lea has named all the *Unionidæ*. Mr. Binney has taken charge of the land and fresh-water *Univalves;* Mr. Bush has the *Polyzoa*. The *Cephalopods* have all been sent to Dr. Steenstrup, of Copenhagen, for a report.

Insects.—Dr. Le Conte and Mr. Ulke have examined the North American *Coleoptera;* Baron Osten Sacken and Dr. Loew the *Diptera;* Dr. Hagen the *Neuroptera;* Mr. Edwards and Drs. Morris and Clemens the *Lepidoptera*, and Mr. Uhler the *Hemiptera*.

Fossils.—Dr. Newberry has studied many of the fossil plants. Mr. Meek, aided by Dr. Hayden, has identified all the fossils collected by the latter gentleman. Dr. Gabb, of Philadelphia, has investigated a number of the tertiary and cretaceous shells.

Rocks and Minerals.—Mr. Thomas Egleston, jr., has been engaged

for several months in the determining and arranging of the minerals and rocks of the collection, aided in a portion of the labor relating to the latter work by Dr. Newberry and Mr. Gibbs.

Plants.—The plants have been in the hands of Drs. Torrey and Gray and Mr. Eaton, who are making much progress in the labor of selecting and labelling a complete series.

Results of many of the above investigations have already been published, others are nearly completed, while some will require a considerable time to complete. All, however, when presented to the world, are announced as being based upon the Smithsonian material, while the greater portion either have been or will be published by the Smithsonian Institution, as detailed in your report.

All the specimens thus submitted to examination are carefully labelled, and the duplicates set aside to be distributed as types to the institutions having strongest claims to them. As the work progresses the amount of material available for such distribution increases, and new collections are more readily used to a similar end.

The labor of cataloguing and registering the specimens has been continued as rapidly as other duties would allow, the result at the end of the year being stated in the annexed table. In this I have been much assisted by the gentlemen named above, as well as in addition by Mr. John M. Woodworth, Mr. W. Prentiss, Mr. R. B. Hitz, and Mr. Fitzgerald.

DISTRIBUTION OF SPECIMENS.

The distribution of specimens has been carried on very largely during the year. About fifty sets of duplicate shells of the United States Exploring Expedition have been sent to as many institutions, while large numbers of species in all classes of the animal kingdom have also been supplied. A rough estimate gives 40,000 species and 80,000 specimens of natural history as thus distributed up to date, while many more are nearly in readiness. When it is considered that all these have been named and labelled by naturalists admitted to be of the highest authority in their respective departments, and that all have thereby the character and value of types, many of them belonging to species first described from Smithsonian specimens, or serving as the materials of elaborate monographs, it will be readily understood how much their systematic and judicious distribution by the Institution all over the world must conduce to the advancement of science.

WORK DONE IN THE MUSEUM.

Good progress has been made during the year in the proper arrangement and labelling of the specimens in the museum hall. Many of the shelves have been edged with black strips, and many stands whitened and renewed. Additional cases have been erected at the east end of the hall for the accommodation of the large birds which crowded inconveniently those already filled. A number of floor cases have been constructed to receive the large collection of shells.

Much labor has been expended on the identification and labelling of the exotic birds, but this work is now nearly finished. When, in accordance with the plan, these, as well as all the other specimens in the hall, are accurately and legibly labelled, with both their scientific and vernacular names, the gratification of the public in examining the rich treasures of the museum will be greatly enhanced.

Table exhibiting the total number of entries on the record books of the Smithsonian collection at the end of each year from 1851 *to* 1861, *inclusive.*

	1851.	1852.	1853.	1854.	1855.	1856.	1857.	1858.	1859.	1860.	1861.
Skeletons and skulls	911	1,074	1,190	1,275	2,050	3,060	3,340	3,413	3,650	4,350	4,459
Mammals	.....	114	198	351	1,200	2,046	3,200	3,226	3,750	4,575	5,550
Birds	.....	.....	.....	4,353	4,425	5,855	8,766	11,390	15,913	20,875	23,510
Reptiles	.....	.....	.....	.....	.....	106	239	4,370	4,616	4,683	6,088
Fishes	.....	.....	.....	.....	.....	155	613	1,136	1,749	2,975	3,643
Eggs of birds	.....	.....	.....	.....	.....	.....	.....	1,032	2,525	4,425	4,830
Crustacea	.....	.....	.....	.....	.....	.....	.....	939	939	979	1,287
Mollusks	.....	.....	.....	.....	.....	.....	.....	.....	2,000	8,832	9,718
Radiates	.....	.....	.....	.....	.....	.....	.....	.....	1,100	1,308	1,800
Fossils	.....	.....	.....	.....	.....	.....	.....	.....	171	705	1,031
Minerals	.....	.....	.....	.....	.....	.....	.....	.....	793	1,132	3,500
Ethnological specimens	.....	.....	.....	.....	.....	.....	.....	.....	.....	550	550
Annilids	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	109
Total	911	1,188	1,388	5,979	7,675	11,222	16,158	25,506	37,197	55,389	66,075

Entries during 1861, 10,686.

LIST OF DONATIONS TO THE MUSEUM IN 1861.

Akhurst, J.—Mammals from Bogota.

Allen, W. T.—Eggs of birds from Virginia.

Ambrose, Rev. J.—Skin of *Mergulus alle.*

Anderson, (a) James.—Wolf-fish from the Gulf of St. Lawrence.

Austin, J. B.—*Menobranchus*, from Chicago.

Backus, Miss Julia E.—Australian boomerang.

Baird, S. F.—Four boxes minerals and rocks, of Essex county, New York, and one bottle *Coregonus* of Lake Champlain.

Baird, W. M.—*Sigillaria*, from Schuylkill county, Pennsylvania.

Barnston, George.—Horns of caribou, skins of mammals and birds, skeletons, nests and eggs, insects, &c. Lake Superior.

Beadle, D. W.—Fishes from Canada West.

Beaulieu, A.—Skins of birds, &c., McKenzie river. (Through B. R. Ross.)

Bishop, F. A.—Soils and earths collected in Utah. (Through Department of Interior.)

Boardman, G. A.—Skins and eggs of birds of New Brunswick.

Boettner, Gustav A.—Insects, &c., of Kansas.

Boyle, P. F.—Chicken with four legs.

Brandt, Henry.—Mammals, birds and eggs of Kansas.

Bremen Museum.—Five mounted Arctic birds, and skull of European brown bear.

Brevoort, J. C.—Mammals from Central America.

Brewer, Dr. T. M.—Nest of eggs of *Helminthophaga ruficapilla.*

British Government.—Fragment of meteorite from India.
Bryant, Dr. H.—Skins and eggs of birds.
Buckner, Rev. H.—Bitumen from the Cherokee nation.
Burling, William.—Skin canoe or cayak, and skin dress of Indians of N. W. America, (through J. W. Raymond.)
Cambridge, Museum of Comparative Zoology.—Eight species embiotocoids of California, and seven of ophiurans.
Campbell, Archibald.—Collections of animals, plants, rocks, &c., made by Dr. C. B. Kennerly and Mr. George Gibbs, naturalists and geologists of the northwest boundary survey.
Campbell, R.—Skins of mammals from the Hudson's Bay Territory.
Canfield, Dr. C. S.—Shells of the coast of California.
Chambliss, S. O.—Crystallized quartz from North Carolina.
Clarke, jr., Lawrence.—Very large collections of mammals, birds, eggs, &c., of Slave lake.
Conradsen, R.—Eggs of *Fulix marila*, Iceland.
Cooper, Dr. J. G.—Birds' eggs from Rocky mountains.
Copenhagen, Royal Museum.—Skins of Arctic birds: Echinoderms, &c.
Couper, W.—Skins of ducks and of *Saxicola œnanthe* from Quebec.
Dawson, Professor J. W.—Pleistocene and Devonian fossils of Canada.
Dodd, P. W.—Skins and eggs of birds, &c., of Sable island.
Flett, Jas.—Birds, &c., from La Pierre House, H. B. T. (through B. R. Ross.)
Foreman, Dr. E.—Minerals, rocks, animal tracks, &c., from near Emmetsburg, Maryland.
Fuller, Mr.—Shells of the coast of Maine.
Gaudet, C. P.—Birds, &c., from Peel's river, H. B. T., (through B. R. Ross.)
Gibbs, George.—See *Archibald Campbell.*
Gilliss, Captain J. M.—Eight bottles alcoholic specimens from Atlantic ocean.
Gilpin, Dr. J. B.—Skins of mammals of Nova Scotia.
Gladmon, Mr.—Nests and eggs from Hudson's Bay.
Gould, C. L.—Sea birds in the flesh, and in skins, from the coast of Maine.
Gove, Captain.—Eggs of birds from Utah.
Greenwood, Mrs.—Specimens of algae from the coast of Massachusetts.
Greenwood, Thomas L.—Nests and eggs of birds.
Gruber, F.—Skins and eggs of birds of California.
Hardisty, W. L.—Mammals, birds, &c., from Fort Liard on the Yukon, (through B. R. Ross.)
Haymond, Dr. R.—Nest and eggs of *Mniotilta.*
Heerman, Dr. A. L.—Skins and eggs of North American birds.
Hewett, Dr. Thomas.—Two mounted ducks.
Hitz, R. B.—Nests and eggs of birds of Pennsylvania.
Holder, Dr. J. B.—Eggs of birds from the Tortugas.
Holt, Hon. Jos.—Chameleon, centipede, &c., from Jerusalem.
Kautz, Captain A. V.—Skins of salmon of Puget Sound.
Kellogg, F.—Eggs of birds from Texas.

Kennerly, Dr. C. B. R.—See *Archibald Campbell.*
Kennicott, Robert.—Zoological specimens, plants, &c., from Great Slave lake.
Kirtland, Prof. J. P.—Living *Nerodia erythrogaster*, or red bellied water snake, from Ohio.
Krider, J.—Mounted tanager, egg of *Nauclerus furcatus*, or swallow-tailed hawk, skins of birds.
Laszlo, Ch.—Nest, eggs, and bird of *Saurophagus derbyanus*, Mexico.
Lazar, Count Coloman.—Skins and eggs of birds of Hungary.
Lincoln, E. D.—Box of eggs from Massachusetts.
Lockhart, James.—Mammals, &c., from the Yukon, (through B. R. Ross.)
Loweree, R. G.—Reptiles from Gaudalaxara, Mexico.
MacFarlane, R.—Birds, &c., from Fort Good Hope, H. B. T., (through B. R. Ross.)
McKenzie, A.—Birds, mammals, &c., from Liard river, H. B. T., (through B. R. Ross.)
Major, J. J.—Reptiles from Gaudalaxara, Mexico.
March, W. Thos.—125 skins of birds of Jamaica.
Maximilian, Prince of Wied.—Skins of European mammals.
Mowry, Lieut. Sylvester.—Skeleton of camel died in California.
Newberry, Dr. J. S.—Mammals from Lake Superior.
Onion, J. S.—Plants from the Mackenzie river, (through B. R. Ross.)
Otis, G. N.—Specimens of *Helix pulchella.*
Page, Capt. T. J.—Fossil wood from Buenos Ayres, and specimens of the materia medica of Paraguay.
Parkinson, D. F.—Box of birds of North California.
Poey, Prof. F.—Types of new species of Cuban fishes.
Prentiss, Wesley.—Skins of birds.
Prince, Miss S.—Annelid from the coast of Maine.
Raymond, J. W.—See *Burling.*
Reid, J.—Skins of mammals and birds, &c., from Great Slave lake.
Repetti, A.—Fossil fishes from Monte Bolca.
Reynolds, Henry.—Minerals, shells, &c., of Maine.
Ross, B. R.—Very full collections of the animals, plants, eggs, ethnological curiosities, &c., of the Mackenzie's river region of Arctic America.
Ross, Mrs. Christina.—Insects, curiosities, &c., from Mackenzie's river, (through B. R. Ross.)
St. Charles College, La.—Reptiles, eggs, &c., of Louisiana.
Samuels, E.—Microscopic slides.
Sartorius, Dr. C.—Birds, mammals, reptiles, and insects, from near Vera Cruz.
Savage, Dr. Thos. L.—Reptiles of Mississippi.
Scott, Mrs. Dr.—*Hippocampus*, or sea-horse, from Rappahannock river.
Smith, Mrs.—Skin and nest of *Emipidonax acadicus.*
Smith, Jas. E.—Two serpents, *Rhinostoma.*
Smith, Dr. N. H.—Skin of Albino blackbird.
Starbuck, Alex.—Shells, &c., of Massachusetts.
Starkey, J. S.—Silver ores from Oregon.

Sternbergh, J. H.—Alcoholic specimens from Panama.
Stone, H.—Eggs of birds.
Taylor, A. S.—Insects, shells, &c., of coast of California.
Taylor, N.—Birds, &c., from Fort Norman, H. B. T., (through B. R. Ross.)
Vanderweyck, P. H.—Minerals from Manhattan island, N. Y.
Vuille, Wm.—Skins and eggs of birds, Siskyon county, California.
Ward, Prof.—Cast of skull of *Ursus spelaeus* from the Cavern of Iserlohn, Germany.
Willis, J. R.—Mounted ptarmigan from Newfoundland, and specimens of natural history of Nova Scotia.
Winston, W. G.—Skins and eggs of birds of Nova Scotia.
Wood, W. S.—Eggs of birds.
Worthen, Prof. A. H.—Tertiary fossils of Mississippi.
Wright, Chas.—Birds, shells, reptiles, &c., of Cuba.
Xantus, J.—Large collections of animals, plants, fossils, minerals, eggs of birds, &c., of Cape St. Lucas; and skins of birds, &c., from the Three Maria's islands and the vicinity of Mazatlan; skins and eggs of birds from the Farralone islands.

LIST OF SMITHSONIAN PUBLICATIONS DURING 1861.

Classification of the Coleoptera of North America. Prepared for the Smithsonian Institution by John L. Le Conte, M. D. 8vo. pp. 302, and 47 wood cuts. Pp. 1–208; published May, 1861; 209–278, March, 1862.

Synopsis of the described Neuroptera of North America, with a list of the South American species. Prepared for the Smithsonian Institution by Hermann Hagen. July, 1861. 8vo. pp. 368.

Extracts from the proceedings of the Board of Regents of the Smithsonian Institution in relation to the electro-magnetic telegraph. (Reprinted from proceedings of the Board of Regents for 1857.) 8vo. pp. 40.

Annual Report of the Board of Regents of the Smithsonian Institution, showing the operations, expenditures, and condition of the Institution for the year 1860. 1 volume, 8vo., pp. 448; seventy-two wood cuts.

LIST OF LECTURES.

The following lectures have been delivered during the months of January, February, March, and April, 1862:

Two lectures by Rev. H. W. Pierson, president of Cumberland College, Kentucky, on "The private life of Thomas Jefferson."

One lecture by Professor A. Ten Brook, late United States consul at Munich, on the celebrated religious exhibition in the Bavarian Highlands, called the "Drama of the Passion," the only relic of the kind which has reached us from the middle ages.

Four lectures by Dr. I. I. Hayes, of Philadelphia, on "Arctic Explorations," with an account of his recent expedition.

One lecture by Rev. J. C. Richmond, of Milwaukee, Wisconsin, on "The origin and Saxon strength of the English tongue."

One lecture by Rev. W. A. P. Martin, a missionary, on "China and the Chinese."

One lecture by Rev. A. Cleveland Coxe, of Baltimore, Maryland, on "Popular taste in art and literature."

Three lectures by Professor Fairman Rogers, of Philadelphia, on "The Glaciers."

Three lectures by Rev. Francis Vinton, of New York, on "The Gentleman," "The Philosophy of War," and "Italy and Dante."

REPORT OF THE SECRETARY.

To the Board of Regents:

GENTLEMEN: I have the honor again, at the commencement of your annual session, to present the report for another year of the operations of the Institution intrusted by the General Government of the United States to your special care.

So much public attention has been absorbed during the last year by the exciting events of the war that we might at first suppose that little or no thought could be bestowed upon purely scientific subjects, such as fall within the province of this Institution to cultivate, or indeed upon any kind of knowledge which has not an immediate bearing on the special requirements of the times. But even in the most sanguinary and gigantic warfare the responsibility for the important plans which are to determine the result of the conflict devolves upon the few, and leaves the many to fall into a condition of comparative mental inactivity.

As a relief from the tedium of this condition, or a prevention from falling into it, a large number of subordinate officers, and even privates, of the army have devoted themselves to pursuits connected with natural history, or to the solution of problems of a theoretical or practical character.

Although the immediate object of war is the destruction of life and property, yet a state of modern warfare is not a condition of evil unmingled with good. Independent of the political results which may flow from it, scientific truths are frequently developed during its existence of much theoretical as well as of practical importance. The art of destroying life, as well as that of preserving it, calls for the application of scientific principles, and the institution of scientific experiments on a scale of magnitude which would never be attempted in time of peace. New investigations as to the strength of materials, the laws of projectiles, the resistance of fluids, the applications of electricity, light, heat, and chemical action, as well as of aerostation, are all required.

The collection of immense armies of individuals of different ages

and nations affords the means of obtaining data of much interest to the ethnologist, while the facts which are gathered from the unusual experience of the battle-field and hospital afford materials for the advance of physiology, surgery, and medicine, which a century of ordinary observation would fail to furnish.

In illustration of what has been done in the line we have mentioned, I would refer to the extended labors of the Sanitary Commission and of the department under the direction of the Surgeon General. The one, besides aiding in the improvement of the health and comfort of the soldiers, has collected a large number of interesting facts relative to the moral and economical condition of the army; while the other, in addition to its immense labors in the care of the sick and the wounded, has recorded the statistics of every part of its varied operations, and formed a collection of illustrations of surgical anatomy which is perhaps unrivalled in any part of the world.

In reference to all the inquiries to which I have alluded, the Smithsonian Institution has been called upon for aid and counsel, and has continually rendered active co-operation and assistance. Its labors, however, in this line, as well as in several other branches of its ordinary operations, are not attended with results which can be given to the world through its publications.

During the continuance of the war we must expect to find that more attention is given to the collection of facts than to the deduction from them of general principles; the latter must be deferred to a period of more tranquillity, when the mind is in a better condition for continued application to the development of a single idea; consequently the number of papers which have been presented to the Institution since the date of the last report is less than that of any previous year.

The meteorological system which had been established, and was in successful operation for several years before the commencement of the war, has been much deranged, few records of observations having been received from the middle States and none from the southern; still, as I have before intimated, the labors of the Institution have been industriously pursued in lines more in accordance with the peculiar condition of the country. A large portion of all the time of the Secretary has been devoted to inquiries referred to the Institution by the different departments of government. The work of preparing the duplicate specimens of the Institution for distribution has been continued. The library has been thoroughly overhauled,

partially rearranged, and a new catalogue of the transactions and proceedings of learned societies prepared for publication. Extensive repairs and improvements have been made in the building, by which several rooms, previously occupied by tanks for receiving rain water, now rendered useless by the introduction of Potomac water, have been reclaimed for other uses.

The efficient income of the Institution has been very essentially impaired during the past year. 1st. By the increased price of all the materials of printing and other articles used in the operations of the establishment. 2d. On account of the high premium on gold required to pay the agents of the Institution in Europe and to meet the incidental expenses of exchanges, and the cost of serials and other works necessary for the use of the collaborators and other persons engaged in researches for the Institution. 3d. In consequence of the non-payment of the interest on the southern State stocks forming part of the extra fund.

Still it will be seen by the report of the Executive Committee that the expenditures of the Institution during the past year have been kept within the receipts, and a large balance retained in the treasury to meet the contingencies which may arise, particularly in the present unstable condition of public affairs.

The interest on the Indiana stock for the first half of the year was paid in specie, which was deposited with Messrs. Riggs & Co., with the understanding that it could be withdrawn in the same currency at any time it might be required. In the settlement of the accounts for the year this specie was sold and the premium added to the receipts.

A power of attorney has been forwarded from the President of the United States to Messrs. Fladgate, Clarke & Finch, of London, authorizing them to collect the remainder of the Smithsonian fund, which was left, by the Honorable Mr. Rush, as the principal of an annuity to the mother of the nephew of Smithson. The power of attorney was forwarded to the care of Honorable Charles F. Adams, American minister to England, and the money, when collected, will be deposited with George Peabody & Co., bankers, London, subject to the order of the Institution.

As a fact connected with the history of this establishment, I may mention that the charter of a society in this city known as the National Institute expired in July last, and that in accordance with the law of

Congress incorporating that society, the Secretary of the Interior delivered the remainder of its library and museum to this Institution.

The National Institute was founded twenty years ago, for the cultivation of science, by a number of gentlemen of the city of Washington, most of them connected with the government. It at first found favor with the public, and the hope was entertained that an endowment, in the form of a donation of land, or otherwise, would be granted by Congress, by which it would be enabled to support a museum and a library, and publish a series of transactions; but this hope was not realized, and as the field it proposed to occupy fell within the province of the Smithsonian Institution, the society gradually declined in activity, and finally allowed its charter to expire by its own limitation. Before the organization of the Smithsonian Institution, the personal effects of Smithson, and the large collection of specimens procured by the exploring expedition, were placed in charge of the National Institute, and from the similarity of names the two establishments were at first frequently confounded with one another.

A large number of valuable books and specimens were presented to the Institute by various societies and individuals; but as there was not sufficient means to constantly employ a curator, or even to supply appropriate rooms for their preservation, these collections have been rendered comparatively of little importance. The specimens in ornithology and entomology were almost entirely destroyed by insects, and the library reduced principally to broken sets of periodicals and transactions of learned societies, duplicates of those already in the library of the Institution. In some cases, however, we have been enabled to supply deficiencies, and the books so incorporated into the Smithsonian collection have been properly designated by an appropriate mark in the manuscript catalogue of the library. The most valuable part of these collections was that which related to mineralogy and ethnology.

Publications. The publications of the Institution, as stated in previous reports, consist of three series: 1st. The Contributions to Knowledge. 2d. The Miscellaneous Collections. 3d. The Annual Reports.

The Contributions include memoirs embracing the records of original investigations and researches, resulting in new truths, such as are considered interesting additions to the sum of human knowledge. Twelve volumes in quarto of this series have been published—the thirteenth is still in the press.

The Miscellaneous Collections include works intended to facilitate the study of the various branches of natural history, to give instruction as to the method of observing natural phenomena, and to furnish a variety of other matter connected with the progress of science. Of this series four large octavo volumes have been issued, and a fifth has been commenced.

The Annual Reports to Congress consist, each, of an octavo volume of 450 pages. They contain the report of the Secretary as to the operations and condition of the Institution, the acts of the Regents, and an appendix, giving a synopsis of the lectures delivered at the Institution, extracts from correspondence, and articles of a character suited to meteorological observers, to teachers, and other persons especially interested in the promotion of knowledge.

Contributions to knowledge.—The following papers have been accepted for publication in the 13th volume of Contributions:

1. The concluding paper of Dr. Kane's Series of Observations in the Arctic Regions.

2. The reductions of the observations of McClintock while in search of Sir John Franklin.

3. Parts II to VI of the Reduction of the Girard College Observations, by Professor Bache.

4. Ancient Mining on the Shores of Lake Superior, by Charles Whittlesey.

5. On Respiration in the *Chelonia*, by Drs. Mitchell and Morehouse.

6. On Magnetic Observations in Pennsylvania and adjacent States, by Professor Bache.

In the reports for 1859 and 1860 accounts are given of two parts (which were subsequently divided into three parts) of a series of reductions of the magnetic observations made at Girard College, Philadelphia, from 1840 to 1845, inclusive, by Professor Bache. The first two of these papers relate to the investigation of what is called the eleven-year period of the variations of the needle, which coincides with the recurrence in frequency of the spots on the sun. The third paper relates to the influence of the moon on the variation of the magnetic needle as shown by the Girard observations.

Of the same series there have been accepted and printed parts 4, 5, and 6. The fourth refers to the change of horizontal force coinciding with the eleven-year period of the spots on the sun. In explanation of this it may be stated that the whole magnetic force of the earth upon a needle freely suspended causes it to take a direction

inclined to the horizon, at all places north and south of the magnetic equator, which direction is called the magnetic dip or inclination. The force with which the needle is drawn into this position may be resolved into two forces—one in the plane of the horizon, and the other perpendicular to this plane. By knowing the horizontal component, and the angle of the dip, the total force may be readily calculated, and as this element can be much more accurately determined than that in the line of the dip, it is the one which is generally made the object of observation.

In the case of the observations made by Professor Bache, the instrument employed was one of Gauss's large bifilar magnetometers, which consisted of a magnetic bar weighing twenty-five pounds, upwards of thirty-six inches long, and suspended horizontally by two long fine wires slightly diverging from parallelism. This magnetic bar instead of being allowed to take a north and south position, or to settle in the direction of the magnetic meridian, was forced to turn nearly at right angles to this position by twisting the pair of suspension wires so as to overcome the directive force of the magnetism of the earth. In this position the bar was in a state of equilibrium between two forces, viz: the torsion of the wires tending to turn the north end of the needle round towards the west, and the horizontal magnetic force of the earth which tended to draw it back into the meridian. In this condition, if the magnetism of the earth diminishes, the force of torsion will prevail, and the bar will move from the meridian. If the magnetism of the earth increases, the torsion will be relatively weaker, and the bar will move in an opposite direction. Attached to this bar was a mirror which, reflecting the image of the divisions of a scale into the object glass of a telescope, enabled the observer to perceive a variation in the intensity of the force, equivalent to a ten-thousandth part of the whole force.

The indications of this instrument were corrected for variations in magnetism produced by changes of temperature, and for a constant small diminution in the intensity of the bar, from an actual loss of its magnetic force. But besides these changes in the magnetism of the bar itself, there is a progressive change in the horizontal component of the earth's magnetism, which may be due either to a change in the direction of the force, or to a change of its intensity. After allowing for these, from observations made in various parts of the earth on changes of direction and intensity, the next step was to separate the large disturbances, which have been called magnetic storms, from the

series of ordinary records. For this purpose deviations from the normal position of the bar amounting to thirty-three scale divisions were considered as due to abnormal disturbances of this kind. This number was ascertained by a theorem founded on the doctrine of probabilities, for which we are indebted to Professor Pierce, of Cambridge. Out of 24,231 observations, 1,698, according to this criterion, were considered as abnormal disturbances. After all the larger disturbances were excluded, new monthly means were taken, and all deviations from these of thirty-three divisions were again set apart.

The result of this elaborate investigation is, that the variation in intensity of the horizontal component of the earth's force is subject to a change coincident with that found from observations in other parts of the world, which has been called the eleven-year period, or that corresponding with the frequency of the appearance of the spots on the sun. The observations extended only through five years, which was less than half the whole period; the data were not therefore sufficient to determine the movement through its complete cycle, although they served to mark the minimum point and the ascending and descending parts of the curves of illustration between two maxima.

The fifth part relates to investigations on the effect of the sun in producing daily and annual variations of the horizontal component of the magnetic force. These investigations were made upon the quantities which remained after removing from the tables the larger or fitful disturbances previously described, leaving the normal effect due to the sun from a change in its distance from the earth, and perhaps from a change in the relative position of its magnetic poles on account of the revolution of the earth in its orbit. Blanks in the tables of observations were filled by interpolation. From these investigations it appears that the horizontal magnetic force of the earth, or the intensity with which a deflected magnetic needle is drawn back toward the north, varies with the different hours of the day. The variation is greatest in summer and least in winter; the force is most intense at a little after 6 o'clock in the morning, and diminishes rapidly until a little after 10 o'clock a. m., when it reaches its minimum, and again commences to increase, and continues to do so until about 3 o'clock p. m., when it again declines until about 11 o'clock at night. The amount of change is much greater in the day time than at night, the whole indicating that this daily variation depends on the varying heat derived from the sun.

The 6th and last part of this interesting series relates to the lunar influence on the horizontal magnetic force.

Each observation, after being corrected for temperature and for the progressive changes in the earth's magnetism, was marked with the corresponding lunar hours, reckoning from the passage of the moon over the meridian. The difference was then taken between the position of the magnetic bar, as calculated from all the hours and that found by observation at each lunar hour, and the difference was considered as the effect of the magnetism of the moon on the earth.

From these and similar observations, it appears that the moon exerts a magnetic influence on the earth. The principal magnetic effect takes place 2 h. 52 m. after the upper passage of the moon over the meridian; secondary effect, 1 h. 7 m.; lower passage, principal minimum, at 6 h. 41″; lower passage, secondary minimum, at 8 h. 19 m. after upper.

Another paper contains an abstract of the observations and results, with the discussion of a detailed magnetic survey of Pennsylvania and part of the adjacent States of New York, Ohio, and Maryland, originally made by Professor Bache, and resurveyed by Mr. Charles A. Schott.

In the study of terrestrial magnetism, two objects are essentially necessary: first, the direction and intensity of the magnetic force of the earth at a given epoch; and secondly, the variation in these elements after a known interval.

In 1840, 1841, and 1843, Professor Bache made a series of observations to determine the magnetic elements at a number of prominent places in Pennsylvania, New York, Ohio, Maryland, and Canada. The whole number of stations at which he ascertained the declination or variation was 16, and of those where the dip and intensity was observed 48.

Last summer Mr. C. A. Schott, an assistant in the coast survey, visited six of the stations at which Professor Bache had previously observed the magnetic elements, and by carefully redetermining them obtained the data for calculating the secular changes which had taken place during an interval of about twenty-years. The observations originally made by Professor Bache, and also the late ones by Mr. Schott, were obtained with instruments of great precision, and will always furnish the elements of future comparison for the study of the changes which the magnetic force of the earth undergoes

in long periods. The paper commences with an abstract of those on the declination. To these are added the latitudes and longitudes of the places observed.

The observed magnetic variations, at the different places, have been reduced to the epoch of January, 1842, by adding the annual increase, namely 2′ 7, found by comparing the observations of 1840 with those of 1862. An elaborate discussion of the horizontal force furnishes a comparison of European and American results. The deductions from the observations on the dip of the needle are given in terms of geographical latitude and longitude, and the isoclinal lines or lines of equal dip are protracted on a map which also contains the lines of equal magnetic force, both in regard to its horizontal and total intensity. Three of the stations visited by Mr. Schott fell within the scope of the coast survey; and the expense of the redetermination of the magnetic elements, at these points, was defrayed by the superintendent of that work; the determinations at the remaining stations were at the expense of the Smithsonian Institution.

An account of the other papers in this volume has been given in the previous report.

Miscellaneous Collections.—Several series of articles forming parts of the series of Miscellaneous Collections, as stated in previous reports, have been undertaken, of which some have been completed, some are still in hand, and others have been printed during the past year.

The first of these series is that relating to the shells of North America, and will consist of the following works :

1. Check lists of North American shells, by P. P. Carpenter, &c.
2. Circular relative to collecting shells.
3. Elementary introduction to the study of conchology, by P. P. Carpenter.
4. List of the species of shells collected by the United States exploring expedition, by the same author.
5. Descriptive catalogue of the shells of the west coast of the United States, Mexico, and Central America, by the same author.
6. Descriptive catalogue of the air-breathing shells of North America, by W. G. Binney.
7. Descriptive catalogue of several genera of water-breathing fresh-water univalves, by the same author.
8. Descriptive catalogue of the *Melaniadae*, or the remainder of the water-breathing fresh water univalves, by George W. Tryon.

9. Descriptive catalogue of the *Corbiculidae* or *Cyclodidae*, a group of bivalves principally inhabiting fresh-water, by Temple Prime.

10. Descriptive catalogue of the *Unionidae*, or fresh-water mussels.

11. Descriptive catalogue of the shells of the eastern coast of the United States, by W. Stimpson.

12. Bibliography of North American conchology, by W. G. Binney.

The first and second articles of the foregoing list were printed in 1860, and described in the report for that year, and since then in their wide distribution have done good service in facilitating the collecting, labelling, and exchanging of specimens of conchology.

The third article was published in 1861, as a part of the annual report for 1860, and a new edition will be incorporated in the Miscellaneous Collections as soon as we can procure the long-promised wood-cuts from the British Museum, to illustrate the work.

The fourth and fifth articles are still in the hands of Mr. Carpenter, and will, it is expected, be ready for the press the ensuing year.

With reference to the sixth article, it may be mentioned that for many years before his death, the late Dr. Amos Binney, of Boston, was engaged in collecting and arranging materials for a general work upon the land shells of the United States. The result of his labors was published after his decease, in three large volumes, giving copious descriptions and accurate figures of all the species. His collections are now in the hands of his son, Mr. W. G. Binney, of Burlington, New Jersey, who has since greatly extended them, and has brought up the subject of his father's work to the present day, by various supplements, memoirs, &c. He has also lately rearranged all the materials in his possession, and prepared from them, for this Institution, the synopsis which is given as the sixth article in the above enumeration.

The seventh and eighth articles include an account of fresh-water univalves of the United States. Within the last twenty years the number of described species of this class of animals known in this country has greatly increased. The descriptions of these previously made were from specimens collected in isolated situations, oftentimes by persons who had not had the opportunity of studying large collections or of comparing typical specimens, and, indeed, in some cases without access to descriptions which had been previously made by others. The shells belonging to this class are characterized, perhaps above most others, by a remarkable range of variation in form and size arising from local causes, or different stages of growth, &c.

Many of them are also furnished with so few positive specific external characters, that for their determination an anatomical difference in their soft parts can alone be depended upon. To study, therefore, satisfactorily single species of fluviatile shells, one must have before him, says Mr. Binney, a very large suite of specimens of all ages, from every portion of the district which it inhabits, as well as authentic specimens of every allied described species, with an equally complete set of individuals. From these facts it is evident that among the descriptions of these shells which have been made by different authors, and published in different works, there must be many which refer to the same species; or, in other words, that the bibliography of this branch of natural history must abound in synonyms exceedingly perplexing to the student, as well as exhibit imperfections in the systematic exposition of the subject which ought not to exist. Such a condition must occur from time to time in every branch of natural history, and it therefore becomes important that some person competent to the task should go over the whole field and reduce to what is called a monograph, or single sketch, all that has been previously done in regard to it.

Mr. Binney in his portion of the catalogue does not attempt to present a complete monograph, but rather a report on our present state of knowledge relative to fluviatile univalves. He has given an English translation of all the original descriptions and a *fac-simile* of the outline of each original figure. The portion of this work which relates to the fresh-water univalves of North America intrusted to Mr. Binney has been completed, and is now in the press. The remainder on the *Melaniadae*, undertaken by Mr. Tryon, has been commenced; but since the family contains a large number of species exhibiting many of the variations above-mentioned, a year or more will be required before it can be completed.

The ninth article, or that relating to the *Cycladidae*, is nearly ready for the press. The recent species of this group are generally small and inhabit the fresh waters of various parts of the world, although some belong to brackish or even marine localities. Mr. Prime has paid particular attention to this group, and is said to be one of the first living authorities in regard to the subject.

The eleventh article of the above-mentioned series will include detailed descriptions by Mr. Stimpson of all the marine shells of the eastern coast of the United States, with original notices of the internal structure.

The twelfth article in the series above enumerated is the bibliography of conchology, which has been prepared to avoid the necessity of repeating bibliographical references in the different manuals just enumerated. It is intended to give, first, an account of all the articles or works of American authors, relative to conchology in general, and secondly, those of foreign writers relative to the conchology of North America.

All the species referred to by authors are enumerated after the title of each article, and such references to the page and date of description are given as will enable any species to be quoted from the bibliography itself without the necessity of referring to the original. A complete index of authors, and of all the species mentioned, placed at the end of the work, will greatly facilitate its use. The first part of this work, embracing the writings of American authors, forms an entire volume of the Miscellaneous Collections of upward of 700 pages, of which 400 are already stereotyped.

Another series of works belonging to the Miscellaneous Collections is intended to facilitate the study and the advancement of the science of entomology, of which the several articles are the following:

1. Instructions for collecting and preserving insects.

2. Catalogue of the described Diptera (flies, mosquitoes, &c.) of North America, by Baron Osten Sacken.

3. Catalogue of the described Lepidoptera (butterflies, moths, &c.) of North America, by Dr. Jno. G. Morris.

4. Classification of the Coleoptera (beetles, &c.) of North America, by Dr. Jno. L. LeConte.

5. Synopsis of the described Neuroptera (dragon flies, &c.) of North America, with a list of the South American species, by Hermann Hagen.

6. Synopsis of the described Lepidoptera of North America. Pt. 1, Diurnal & Crepuscular Lepidoptera, by Dr. Jno. G. Morris.

7. List of the Coleoptera of North America, with descriptions of new species, by Dr. John L. LeConte.

8. Monographs of the Diptera of North America, by H. Loew, with additions by Osten Sacken.

9. Catalogues of Homoptera and Hemiptera (chinches, roaches, &c.) of North America, by P. R. Uhler.

10. Descriptive catalogue of the Hymenoptera (bees, wasps, &c.) of North America, by Dr. Henri DeSaussure.

These have all been described in previous reports, and have all been

printed excepting the 9th and 10th, which are still in preparation, and a part of the 7th, which has been delayed on account of the call on Dr. LeConte to a position in the medical department of the army of the United States.

The instructions for collecting and preserving insects were published in the appendix to the report for 1858. A new and enlarged edition will be published during the coming year as a part of the next volume of the Miscellaneous Collections.

Another part of the Miscellaneous Collections is a series of tables furnished by Professor Guyot in addition to the set of physical tables by the same author, previously published by the Institution. The first of these is intended for converting the klafter and feet of Vienna into measures of length of other countries. They are to be substituted for those contained in the former edition, because they are derived from a new comparison of the *klafter* of Vienna and French *toise*, by Von Struve and Von Littrow. This comparison has furnished the standard adopted in the great trigonometrical survey of Austria. The second set of tables is for converting the Spanish or Mexican and Bolivian varas and feet into English and French measures.

The preceding tables have been printed, and are inserted in volume I of the Miscellaneous Collections.

The third set of tables gives the value of a degree of the meridian in every degree of latitude from the equator to the poles, in metres, kilometres, German miles, nautical leagues, French leagues, geographical or nautical miles, and English statute miles.

The fourth set of tables gives the value of each degree of longitude on each parallel of latitude, from 0° to 90°, in the same measures as those mentioned above.

The two preceding sets of tables, which are based on Bessel's terrestrial elements, have been computed under the direction of Professor Bache at the office of the Coast Survey, and have been kindly furnished by him for this volume. The columns of the German miles and nautical and French leagues have been added to make the table more complete.

The fifth set of tables is for converting the most usual measures of length into each other, such as myriametres and kilometres, Austrian, Prussian, and German miles, nautical leagues, French, Spanish, and Mexican leagues, geographical or nautical and statute miles, and Russian wersts.

The sixth set of tables is for the conversion of the corresponding surface or square measures of the preceding table into each other.

These measures, which are also founded on the late terrestrial elements of Bessel, have been selected with reference to the frequency of use in the consultations of the official publications of different European nations. Each of the above tables furnishes the value of every full number from 1 to 100, in six figures for the measures of length, and seven for those of surface.

The seventh set of tables gives the velocity of rotation of the earth for each degree of latitude, expressed in the measures of length most frequently used, and will facilitate computations in regard to the velocity of the wind.

The whole series comprises over 17,000 separate numbers, filling 70 large octavo pages.

It is proposed to add to these tables one giving the length of time of sunshine in different latitudes for each day in the year, and, to complete the series, a number of tables for calculating the resultant direction of the winds.

It is believed that these tables will be received as a welcome addition to the physical tables previously published by the Institution, and which are now well known and used in every part of the civilized world. They will be of value to the meteorologist and physical geographer, as well as to the statistician and political economist. The first set is indispensable for easily computing distances on globes, maps, &c.; the second will greatly facilitate the use of the numerous data furnished by travellers, scientific publications, and especially the official statistical information contained in the various documents of the states of Europe. The selection of the various measures is made with special reference to the latter—as the myriametre and kilometre for the study of later French publications, and the common French league for the older ones; the Austrian and Prussian miles, the Russian werst, and English statute mile for publications in the countries where those measures are used. In the preparation of these tables a question has arisen whether an additional series should be constructed for the conversion of the American foot into the English, between which there is, unfortunately, a slight difference.

Reports.—The annual reports to Congress are printed at the expense of the government, with the exception of the cost of the

wood-cuts, which is at the expense of the Institution. The report for 1861 contains, besides the report of the Secretary and the acts of the Regents, a Eulogy on Prof. Felton, by Dr. Woolsey, President of Yale College; a Eulogy on Hon. Stephen A. Douglas, by Hon. S. S. Cox; synopsis of lectures on the Construction of Bridges, by Fairman Rogers, of the University of Pennsylvania; lecture on the relation of Time and Space, by Prof. S. Alexander, of the College of New Jersey; lecture on Arctic Explorations, by Dr. I. I. Hayes; a memoir of Geoffroy St. Hilaire, by M. Flourens; the chemical analysis of the Sun by means of the Solar Spectrum; the small planets between Mars and Jupiter; studies and experiments on Metamorphism, by M. Daubrée, and a number of articles on Archæology, all translated for the Institution; also a report on Nitrification, prepared for the Institution by B. F. Craig, M. D.; the history of Petroleum, by T. Sterry Hunt; and the explosibility of Coal Oil, by Z. Allen; list of birds inhabiting the District of Columbia, by E. Coues and D. W. Prentiss; and a series of prize questions of scientific societies, together with a number of minor articles.

The reports for a number of years past have contained a series of memoirs of distinguished men of science, members of the French Academy, translated for the Institution by C. A. Alexander, Esq., of this city. It is intended to continue the translation and publication of similar memoirs, and when the number is sufficient to form an ordinary sized volume, to collect and publish them in a separate form.

Of the last report, 10,000 extra copies were ordered by Congress, of which 4,000 were presented to the Institution for distribution among its special correspondents. The requests for copies of this work have been constantly increasing from year to year, and it is to be regretted that the pages were not stereotyed, since there is now a large demand for back numbers, to complete sets, which cannot be obtained.

Previous to last year we were allowed to have extra copies of certain articles of the report struck off for separate distribution, but under the new rules for the regulation of the public printing this privilege was denied us in the case of the report for 1861. It is thought, however, that if a proper statement were made to Congress, a clause would be added to the acts relative to the government printing which would give all the facilities required.

The following general rules for the distribution of the reports have been adopted:

1st. They are presented to all the meteorological observers who send records of the weather to the Institution.

2d. To the collaborators of the Institution.

3d. To donors to the museum or library.

4th. To colleges and educational establishments.

5th. To public libraries and literary and scientific societies.

6th. To teachers, or individuals who are engaged in special studies, and who make direct application for them.

It is proper to remark that, owing to the many changes which have taken place since the commencement of the war in the list of correspondents of the Institution, it has not been thought advisable to send the report, as heretofore, to all whose names are on the record of distribution, but in most cases to wait until direct application is made by letter for a copy of the work. Whenever a report is sent to any address, a separate announcement is made through the mail by enclosing a blank receipt, to be signed and returned to the Institution.

In view of the great cost of paper at the present time and the space required for storage of a large edition of each volume of the publications of the Institution, it has been thought advisable to stereotype the text and strike off only as many copies as are required for immediate distribution, printing a new supply from time to time to satisfy the demands as they arise. By the adoption of this plan, should the cost of paper return to its normal rate, the expense of the stereotype plates would be saved.

Meteorology.—The meteorological system has continued to be carried on as in former years, though necessarily very much diminished in extent on account of the absence of records from the southern States. The volume of meteorological reductions from 1854 to 1859, an account of which was given in the last report, has been published and distributed to the meteorological observers, to public libraries, and foreign institutions. Many letters have been received expressing the new interest in the system that has been awakened by the appearance of this volume, and the records which before existed only in the archives of the Institution are now in the hands of a large number of the students of science, whose various tastes and abilities will enable them to draw from them important general results. The second volume is still in press at the Government office, the print-

ing of it having been delayed by that of documents of more immediate importance. It is expected, however, that it will be finished during the year 1863.

The daily telegraphic bulletin of the state of the weather, which was entirely discontinued for some time on account of the demands of public business, has been partially resumed, and we are indebted to the courtesy of Mr. Anson Stager for occasional despatches since the early part of December last, from stations in the Rocky mountains, and even from points as far west as California. These telegrams, however are not sufficient to enable us to predict, with much probability, the changes of weather, without the additional information from the south and southwest. The telegraphic bulletin giving the daily condition of the weather at various important positions on the continent of Europe continues to be lithographed by the Imperial Observatory at Paris, and is sent to the Institution by every steamer.

In May last a circular was distributed asking for information on the subject of tornadoes, the principal design of which is to direct attention to a full and definite system of observations, so that on the recurrence of tornadoes precise and uniform reports may be obtained as to all the features of the phenomenon. In addition to the special replies to the circular, a number of general answers have been received, which are of interest in helping to define the regions of our country where these destructive visitants frequently appear, and those in which they are happily almost unknown. From Steuben, Maine, Mr. J. D. Parker writes: "There was never a tornado seen hereabouts by any one, so far as I can learn;" and Mr. R. H. Gardiner, at Gardiner, in the same State, says: "Tornadoes are of very rare occurence in this part of the country. I have no knowledge of any within the last fifty years." From Vermont, Mr. Hiram A. Cutting, of Lunenburg, informs us that "there never was but one tornado, in this section, in my remembrance, and that was at Victory, about twenty miles northwest of this place, in the summer of 1842." Mr. Levi Packard, residing in the State of New York, at Spencertown, Columbia county, between the Hudson river and Massachusetts, tells us there are no tornadoes in that tract of country. On the other hand, we are informed that over the swampy region of the great bend of the Mississippi tornadoes are very frequent, and the paths of many of them are marked upon the ground for miles by prostrate trees and other indications of a violent disturbance of the atmosphere.

Correct general information of this kind would furnish material for the preparation of an interesting map, showing at a glance the regions where tornadoes annually prevail, and those where they occur only occasionally, or not at all. In meteorological investigation we always make a step in advance when the region to which phenomena are limited can be accurately defined.

Since the latter part of October, a series of daily observations has been made for the Institution, by Mr. Force, on the temperature of the hydrant water in Washington. The water flows some six or seven miles through iron pipes, under ground, before reaching the place of delivery, and acquires, approximately, the temperature of the soil at the depth at which the pipes are laid. The observations were made at a hydrant out of doors, about 7 o'clock every morning, the water being allowed to flow two or three minutes before noting the temperature. When the curves for the water and the air are plotted on the same diagram and the same scale, they exhibit to the eye, in a very striking manner, the extreme fluctuations of the temperature of the air, compared with that of the ground, at the depth of only two or three feet. They also show the slowness with which variations of temperature penetrate the earth. The change produced by a decided increase or decrease of temperature being generally indicated by the water two or three days after it occurred in the open air.

Among the contributions relative to meteorology which have been received at the Institution, is a series of tri-daily observations made at Brunswick, Maine, by the late Professor Parker Cleaveland, from 1808 to 1859. The records include observations on the ordinary thermometer; the maximum and minimum thermometer, the barometer, rain-gauge, wind-vane, &c. It is proposed to publish these in full, as a part of the second volume of the "Meteorological Results," but for this purpose it is desirable that the means for months, years, and the whole period, should be calculated, and this work is now in progress, and will probably be finished before the printer will call for the copy. The publication of these observations is in accordance with the plan adopted to print in full a number of long series of observations such as those we have already published, viz: for Providence, Rhode Island, and Washington, Arkansas. They will be of much interest for solving various meteorological problems, such as the recurrence of particular phenomena, changes of seasons,

verification or disproval of the many empirical rules which have been proposed and are used for predicting the weather, &c. The extensive series of observations made by Dr. S. P. Hildreth, of Marietta, Ohio, mentioned in a previous report, belong to the same class, and will also be inserted in the volume above mentioned.

We have already referred to the additions to the meteorological tables of Professor Guyot, and stated that it is proposed to still further increase these tables by a series intended to facilitate the calculation of the mean direction of the wind.

The directions and blanks for making meteorological observations which have been prepared and published at the expense of the Institution have been extensively distributed in this country, and translated and reprinted abroad. The geographical and statistical society of Mexico has recently adopted them, and signified the intention of co-operating with the Institution in extending its system of observations more widely over this continent. Were not our general system of meteorology interrupted by the discontinuance of the reception of observations from the southern States, this would be an important addition to our means of tracing the extent of disturbance of the atmosphere which accompanies our winter storms.

Professor Guyot availed himself of a visit which he made to Europe last year to establish by his own observation the relation of the standard barometers used by the Institution to the most important standards of the European observatories. The comparisons were made by means of two Fortin barometers, with cistern of constant level, as modified by Ernst, of Paris, and constructed several years ago by that skilful artist for the Institution. Both instruments had been previously tested by long usage, and just before leaving this country their relation to a large standard barometer by Newman, of London, and a large sized barometer by Ernst, was ascertained by a series of numerous comparisons made with great care. These two instruments were directly compared in Europe with a standard barometer at Kew observatory, now acknowledged as the normal barometer among English meteorologists, and with the standard instruments at the Brussels, Berlin, and Geneva observatories, by the kind permission and assistance of the directors of these several institutions, Professors Stanley, Quetelet, Enke, and Plantamour. The last set of comparisons at Geneva, Switzerland, was found particularly useful from the fact that by the untiring care of Professor Plantamour the relation of his barometer has been fully established

with that of Regnault in the College de France, and that of the observatory of Paris. On his return Professor Guyot made a new series of comparisons with the same Smithsonian standards as before, the results of which proved that no change had taken place during his absence in the two barometers used abroad. It is believed that these comparisons establish a correspondence of the European and American standard barometers within the narrow limit of one or two-thousandths of an inch. A large standard is about to be prepared under the direction of Professor Guyot, to which these determinations will be referred.

The meteorological branch of the operations of the Institution still continues under the charge of Mr. William Q. Force, to whose habits of order and scrupulous accuracy the system is much indebted for whatever value it possesses.

Among the contributions to the meteorological materials of the Institution, presented during the last year, is a series of continuous records of the changes of atmospheric temperature made by a machine invented by Dr. James Lewis, of Mohawk, New York. This instrument consists of an arrangement of a number of brass and iron wires, whose relative contraction and expansion give motion to a metallic point, the several positions of which are marked by a puncture in a fillet of paper, produced by a blow of a hammer moved by clockwork, repeated at regular intervals of fifteen minutes. Although instruments of this kind have been frequently constructed, they have generally not possessed sufficient sensibility to indicate the fitful changes of the atmosphere. Dr. Lewis appears, however, to have been more successful in his invention, and from the results which he has presented to us it would appear that the registers of his self-recording instrument are of considerable value in determining the general law of changes of temperature, especially during the day, and thus furnishing corrections by which the mean temperature of places in the same latitude can be obtained from observations made at only one or more hours of the day. It may be mentioned here that an idea has been very prevalent in this country among observers that to obtain the average temperature of a place, the best times of observation are about sunrise and sunset, and at 2 or 3 o'clock in the afternoon; but as the rising and setting of the sun occurs at different times in different seasons of the year, and as the maximum temperature occurs at different hours in different latitudes, it is best always to make the observations as nearly as possible at fixed hours, as, for

instance, at those which have been adopted by this Institution, viz: 7, 2, and 9; since, by observing this rule, corrections derived from such observations as those made by Mr. Lewis can be applied so as to give with more precision the average temperature of the place of observation.

The present Surgeon General, Dr. Hammond, takes a lively interest in meteorology, as one of the branches of science intimately connected with his department; and as soon as the posts and cantonments are again permanently established will reorganize the system of army observations on a more extended scale, and furnish it with the instruments and instructions prepared under the direction of this Institution.

Laboratory.—The operations of the laboratory during the past year have principally consisted in the preparation of a large quantity of Laborraque's disinfecting liquid, and the continuance of the examination of minerals preparatory to a distribution of duplicates. More than a thousand bottles of the disinfecting liquid have been prepared for the use of the hospitals in the city of Washington. The efficacy of this substance has been demonstrated by abundant experience. Simply sprinkling it on the floor, or wetting with it a cloth placed near the source of unpleasant effluvia, at once renders the air of the apartment entirely inodorous. The preparation of this substance is still going on and will be continued as long as the article may be required for the hospitals.

The examination of the minerals preparatory to a distribution of the duplicates has not been carried on as rapidly as could be wished, on account of the absence of the person to whom this duty was assigned. We have, however, ready for distribution, upwards of two hundred sets of specimens, properly labelled, of the stones used in erecting the public buildings in the city of Washington.

In consideration of the high rate of exchange no purchases of foreign apparatus have been made during the past year. Occasion however, has been taken, in the interval of other business, to remodel the cases of the apparatus room, in order to a better disposition and display of the instruments. The room itself is fifty feet square with a ceiling of twenty-five feet in height. Around the four sides of this room, cases of about six feet deep and ten feet high have been constructed. The upper floorings of these cases extend about two feet beyond their front, and thus form a projecting gallery entirely around the room, which serves for the display of larger instruments as well

as to increase the available capacity of the apartment. The whole arrangement produces a pleasing architectural effect, while from the size of the cases instruments may frequently be used in the way of experiment without bringing them out into the room, or exposing them to the handling of visitors.

Collections of Specimens of Natural History, &c.—In the last two reports a distinction was drawn between the large collections of specimens of natural history, &c., which have been made through the agency of this Institution and what is called the Smithsonian Museum. This distinction has become necessary in order to separate more clearly in the public mind two objects, which, although they are generally confounded, are in the case of this Institution essentially different. The object of making large collections of duplicate specimens is twofold, first, to advance science by furnishing to original investigators, wherever they may reside, new materials for critical study; and second, to diffuse knowledge by providing colleges, academies, and other educational establishments with the labelled specimens necessary to give definite ideas of the relations and diversities of the various productions of nature. The principal end attained by the public museum of the Institution has been the gratification and incidental instruction of the visitors to the city of Washington. It is true that there are preserved in the museum the type specimens of the species and genera which have been described, and of which accounts have been published at the expense of the Smithson fund, or by other means; but for the preservation of these there is required no costly building nor corps of attendants, and, indeed, the charge of them might well be assumed by other establishments.

From the foregoing exposition it will readily be seen that while the collecting and distributing of large numbers of specimens is an important means of increasing and diffusing knowledge, and as such is in strict accordance with the will of the founder of this Institution, the support of a public museum, the effects of which must of necessity be in a great degree local, is not so consistent with the liberal intention of the bequest.

It should not be inferred from the foregoing remarks that I mean to disparage the establishment of a general collection of objects of nature and art, like that of the British Museum or the Garden of Plants, which includes in its design the encouragement of original study as well as of popular instruction and amusement. On the contrary, I

have always advocated this measure as one of national importance, while I have endeavored to show that it ought not to be attempted by means of the Smithsonian fund, and that it could only be properly carried out by a liberal annual appropriation from the public treasury.

I have thought it necessary frequently to urge the importance of guarding against the tendency to increase the expenditure on local objects, and against accepting presents on condition that they shall be perpetually preserved and exhibited to the public at the expense of the Smithsonian fund. If this propensity were indulged in and donations solicited on the terms mentioned, which are those usually agreed to in similar cases, the whole income of the bequest would be ultimately absorbed in providing house-room and accommodations for the collections; and the active operations, as they are called, which have given so much celebrity to the name of Smithson, and have constituted the distinctive feature of the establishment, would cease.

The collections of specimens which have formed the prominent subject of the preceding remarks may be divided into two classes, namely, those which have been studied and an account of them published in the reports of the government expeditions, or in the transactions of the Smithsonian and other institutions, and those which have not been described, and which consequently are considered of much interest to the naturalist, who may be anxious to make new explorations in the domain of natural history. Of both classes the Institution possesses a large number, for the disposition of which the following general rules have been adopted:

First. To advance original science, the duplicate type specimens are distributed as widely as possible to scientific institutions in this and other countries, to be used in identifying the species and genera which have been described.

Second. For the purposes of education, duplicate sets of specimens, properly labelled, are presented to colleges and other institutions of learning in this country.

Third. These donations are made on condition that due credit is to be given the Institution in the labelling of the specimens, and in all accounts which may be published of them.

Fourth. Specimens are presented to foreign institutions, on condition that if type specimens are wanted for comparison or other use in this country they will be furnished when required.

Fifth. In return for specimens which may be presented to colleges and other institutions, collections from localities in their vicinity shall be furnished when wanted.

In the disposition of the undescribed specimens of the collection, the following considerations have been observed as governing principles :

First. The original specimens are not to be intrusted for description to inexperienced persons, but to those only who have given evidence of an ability properly to accomplish the task undertaken.

Second. Preference is to be given to those who have been engaged in the laborious and difficult enterprise of making complete monographs.

Third. The investigator may be allowed, in certain cases, to take the specimens to his place of residence, and to retain them for study a reasonable time.

Fourth. The use of the specimens is only to be given on condition that a series of types for the Smithsonian Museum will be selected and properly labelled, and the whole returned in good condition.

Fifth. In any publications which may be made of the results from an investigation of the materials from the Smithsonian collection, full credit must be accorded to the Institution for the facilities which have been afforded.

During the past year, the labelling of specimens for colleges and other educational institutions has been continued, but the work has not advanced with as much rapidity as was expected, owing to the call upon many of our co-laborers to join the army. Under the most favorable circumstances the labelling requires much labor, and cannot be properly done except by persons specially trained in particular branches of natural history.

The assorting and labelling of the principal part of the shells is still in progress under Mr. Philip P. Carpenter, of Warrington, England, assisted by Dr. Alcock. Other shells have been named, or are in the process of being named, by Prof. Agassiz and Dr. Stimpson, of Cambridge; Mr. Isaac Lea and Mr. G. W. Tryon, of Philadelphia; Mr. W. G. Binney, of New Jersey; Mr. Prime, of New York; Mr. Busk, of England; and Dr. Steenstrup, of Copenhagen.

The botanical collections, to which several additions have been made during the past year, are still in charge of Dr. Torrey, of New York, and Dr. Gray, of Cambridge. The assorting of the rocks and minerals is carried on in the Institution; and as an auxiliary work, Mr. Egleston has prepared a general list of mineral species to facilitate the labelling and exchange of specimens. This will be printed and distributed to correspondents during the present year.

The additions to the collections of insects, during the year, have been referred for identification, as usual, to the collaborators in the line of entomology, viz: To Baron Osten Sacken, Dr. Le Conte, Dr. Loew, Dr. Hagen, Dr. Morris, Dr. Clemens, Mr. Edwards, Mr. Norton, Mr. Scudder, Mr. Ulke, and Mr. Uhler.

The whole number of entries on the record book of the Smithsonian collection, up to the end of 1862, is, according to the statement of Professor Baird, 74,775, and when it is understood that each entry is that of a lot which in most cases contains many specimens, some idea may be formed of the whole number of specimens which have been collected through the agency of the Institution, and the service which will be rendered when all these are made available for the advancement and diffusion of knowledge among men.

The Museum of the Institution consists principally of the type specimens of the various collections of objects of natural history and ethnology obtained by the different exploring and surveying expeditions sent out by the government of the United States, as well as by various special expeditions instituted at the expense of the Smithsonian fund. These specimens have generally been described, and in many cases figured in the reports published by Congress, or in the Smithsonian or other transactions, and have thus rendered their chief service in the way of advancing knowledge. Yet, in view of the future progress of science, it is important, irrespective of their use for the purposes of education, that these specimens should be carefully preserved, in order that they may be referred to as the original objects from which the descriptions were drawn. It often happens that in the subsequent study of similar specimens from other localities doubts arise as to some points of the published descriptions, which can only be solved by a reference to the original materials, and it is also frequently desirable to re-examine the specimens in relation to some new point of interest which may have been developed in the course of more extended investigation.

The additions to the museum should be confined principally to the type specimens collected and described at the expense of the general government, or under the immediate auspices of the Institution. Even thus restricted the specimens will increase in number as rapidly as that part of the Smithsonian fund, which is taxed for their support, will permit, and in time they will form of themselves a valuable collection of authentic illustrations of the natural history of America. It is true, as is often urged, that the value of these speci-

mens would be enhanced by the addition for comparison of corresponding specimens from other parts of the world; but the full adoption of this extension of the plan would involve the maintenance of a general museum, which, as has been repeatedly stated, is incompatible with the means and design of the Institution.

The only museum at present in this country, expressly established for the threefold object of popular instruction, systematic study, and original research, is that at Cambridge, under the direction of Prof. Agassiz. For the purposes of such a museum specimens of all kinds, from every part of the earth, are necessary, and in accordance with the liberal policy by which it has always been governed, the Smithsonian Institution has actively co-operated in assisting this exemplary enterprise of the State of Massachusetts.

During the past year the type specimens of a number of series of collections, of which the duplicates have been separated for distribution, have been transferred to the museum. The work of labelling the specimens, so that the common as well as the scientific name of each article may be distinctly exhibited, has been continued, and will probably be completed before the end of the present year. But for an account in detail of what has been done in regard to the museum and the collections, I must refer to the report of Prof. Baird, herewith submitted.

As a matter of interest, and, in some cases, of importance, a record book is kept at the principal entrance of the building, in which the names of all the visitors are entered. Since the date of the last report the Institution has been visited by thousands of persons, who have been called by business or pleasure to the national capital. The specimens of natural history and ethnology have excited much popular interest, particularly among those who come from the more distant western portions of the country. The museum and grounds are a favorite resort for the convalescent soldiers. The trees and shrubbery of the latter are growing finely, and the whole park, under the care of the Commissioner of Public Buildings, B. B. French, Esq., forms no unworthy memento of the talents of the lamented Downing, by whom its plan was designed.

I am sorry, in this connection, to consider it my duty to refer to the existence of an evil over which, though you have no official control, yet as legislators and prominent citizens you may exert a beneficial influence. I allude to the city canal, which forms the boundary of the Smithsonian grounds on the north. The basin or widest part of

this canal, across which most of the visitors to the Institution have to pass, has become, since the introduction of the Potomac water, the receptacle of the sewage of the city, and is now an immense cesspool, constantly emitting noxious effluvia prejudicial to the health and offensive to the senses of all who approach the locality. This nuisance, which will continue to increase with the increasing use of the Potomac water, may perhaps be mitigated by placing a gate at each end of the wider part of the canal, to be closed after high tide and opened occasionally at low water, so as to discharge the contents with a force which would remove, in part, at least, the deleterious deposit. But the only effectual remedy, as it appears to me, is to fill up a part of the width of the canal, and convert the remainder into a sewer by covering it with an arch of masonry. This sewer may perhaps be cleared out by flood-gates, as before mentioned, or by anchoring flat-boats at the mouths of the drains, to be removed and emptied when filled. But whatever plan may be adopted, the character and prosperity of the city, as well as the interests of the Institution, are involved in a speedy and efficient effort to remove the evil. The small pecuniary benefit which may result from the canal to the city or to individuals ought not have any weight in the decision of this matter.

Explorations.—A part of the large collections which have just been described was gathered through officers and other persons attached to the surveying and exploring expeditions sent out by the government, and another part by expeditions expressly organized for the purpose, under the immediate auspices of the Institution. Among the latter is the expedition mentioned in the last two reports as having been undertaken by Mr. Robert Kennicott, of Chicago.

This enterprise has terminated very favorably, the explorer having returned richly laden with specimens, after making a series of observations on the physical geography, ethnology, and the habits of animals of the regions visited, which cannot fail to furnish materials of much interest to science.

The route traversed by Mr. Kennicott was from Lake Superior, along Kamenistiquoy river, and Rainy and Winnipeg lakes, up the Saskatchewan river to Cumberland House; thence nearly north through a series of rivers and lakes to Fort Churchill on English river, up the latter to Methy Portage, at which point he first reached the headwaters of the streams flowing into the Arctic ocean; thence

along the Clear Water river and Athabasca lake, down Peace river into Great Slave lake, and along the Mackenzie river to Fort Simpson. At this place Mr. Kennicott spent a part of the first winter with the officers of the Hudson's Bay Company, making excursions up the Liard river to Fort Liard in autumn, and again on snow shoes in January. Before the close of the same winter he went up the Mackenzie to Big island, and thence northwest to Fort Rae, near the site of old Fort Providence. From this point he travelled on the ice across Great Slave lake to Fort Resolution, at the mouth of Peace river, where he spent the summer of 1860. He next descended the Mackenzie to Peel's river, and thence proceeded westward across the Rocky mountains, and down the Porcupine river to the Youkon, in the vicinity of which he spent the winter of 1860–'61, and the summer of 1861. The winter of 1861 and '62 was spent at Peel's river, and La Pierre's house in the Rocky mountains, and in travelling from this point up to Fort Simpson and back to Fort Good Hope on the Mackenzie. He left the last-mentioned place on the 1st of June, 1862, and reached home in October.

During the whole exploration he was the guest of the Hudson's Bay Company, the officers of which not only furnished him with free transportation for the materials he collected, but also extended to him in the most liberal manner the hospitalities of their several posts, and facilitated in every way in their power the objects of his perilous enterprise.

The principal object of the exploration was to collect materials for investigating the Zoology of the region visited. Mr. Kennicott, however, also collected specimens of plants and minerals, and gave considerable attention to the ethnology of the country, in observing the peculiarities of the various Indian tribes, and forming vocabularies of the languages. He carried with him a number of thermometers, and succeeded in enlisting a number of persons as meteorological observers, as well as in exciting an interest in natural history, and in physical phenomena, which cannot fail to be productive of important information respecting a region of the globe but little known.

The contributors to this exploration, besides the Smithsonian Institution, were the University of Michigan, the Audubon Club of Chicago, and several private individuals interested in the advance of natural history.

Mr. Xantus, whose explorations in Lower California have been

mentioned in several of the previous reports, has been appointed by the government of the United States consul on the western coast of Mexico; and in this new and interesting region, I doubt not that, with unabated zeal, he will be able to add much that is new and important to the different branches of natural history. To facilitate his labors in the way of making collections, the Institution furnished him with a full set of articles necessary for the most efficient prosecution of a work of this kind.

Exchanges.—The system of exchanges still continues to render important aid to the literary and scientific intercourse of this country with other parts of the world. It is not confined on this side of the Atlantic to the United States, but extends to Canada, the West Indies, and South America. From the tabular statement given by Professor Baird, it appears that during the year 1862 there have been sent to foreign countries 1,203 packages, each containing, in most cases, a number of separate articles. These packages were enclosed in 114 boxes, measuring in the aggregate upwards of 1,000 cubic feet, and weighing 28,936 pounds. The number of packages received in return for parties in this country, exclusive of those for the Institution, was 2,105, which would on an average amount to upwards of 10,000 articles.

The Institution has received on its own account 5,035 articles, including those for the museum as well as for the library.

The thanks of the Institution continue to be due to various parties for their liberality in transporting boxes and packages free of charge, or in materially reducing the ordinary expenses. Those claiming especial mention are the North German Lloyds, between Bremen and New York, the Hamburg and New York Steamship Line, the Cunard Line, the Panama Railroad, and the Pacific Mail Steamship Company, all of which transport Smithsonian packages free of charge. The Adams's Express Line transmits our packages partly at reduced rates and partly free. The magnitude of the favors conferred by these companies may be readily understood by a reference to the statement made above that the weight of the packages sent to Europe alone amounted, during the year 1862, to nearly 30,000 pounds.

Library.—The library during the last year has continued steadily to increase, principally by exchanges, but also by purchase. By exchanges there have been received 1,211 octavos, 348 quartos, and 52 folios. Of parts of volumes in octavo 2 441, in quarto, 767, in folio,

161, maps and charts, 55, making a total of 5,035 articles. In addition to these about 500 volumes have been purchased.

A catalogue of transactions and proceedings of learned societies contained in the library of the Smithsonian Institution was published in July, 1858, and widely distributed, with a circular requesting that the deficiencies in the sets might be supplied, and other series be added to the collection from the duplicates in foreign libraries. This request has been so liberally complied with, and so many additions have been made to the collection, that a new edition of the catalogue has become necessary. This work is nearly ready for the press, and if the means of the Institution should permit, will be published during the coming year.

The value of this library will be much enhanced by the publication of the Systematic Index to all the articles contained in the transactions and proceedings of the learned societies of the world, now in course of preparation under the supervision of a committee of the Royal Society of London. This index will include the titles of papers published by the academies of Russia, Sweden, Denmark, Netherlands, Germany, Switzerland, France, Spain, Italy, and the States of North America. Some idea of the magnitude of the work, says General Sabine, may be formed from the fact, that it begins with the year 1800, and is brought down to the close of the year 1860. The titles are all in quadruplicate and now form sixty-two manuscript volumes. It is expected that the index will be completed within the year 1863, and that it will be published without unnecessary delay. It will be a work of immense importance to all engaged in scientific pursuits; it is difficult to estimate the amount of waste of time and labor of the student, arising from ignorance of what has already been achieved in the several departments of science; and none but one who has endeavored in the investigation of perhaps a single subject to explore the contents of scientific periodicals can judge of the weariness and discouragements of the search. A copy of this work will undoubtedly find a place in each of the principal libraries of the United States, and with the distribution of the catalogue before-mentioned will give the American student ready reference and access through the Smithsonian collection to all the important original papers on scientific subjects which have been published during the present century.

Gallery of Art.—The only additions made to the Gallery of Art during the past year, have been a bust of Professor Benjamin Silli-

man, senior, presented by his son, and another of General William H. Sumner, presented by George Wood, esq., of this city.

The Indian gallery belonging to Mr. Stanley still continues on deposit in the Institution. It is to be feared that by reason of the present condition of the country Congress will not think it advisable to purchase these characteristic illustrations of the aboriginal inhabitants of this continent, and it may perhaps become a subject of consideration with the Regents to make some provision for the preservation of the collection in its integrity, since it is possible that the owner may otherwise be obliged to dispose of it in parts, in order to meet his private pecuniary engagements.

Lectures.—On account of the uncertainty of the times and the preoccupation of the public mind no arrangements were made to furnish a course of public lectures on the part of the Institution for the winter of 1861–'62; but the use of the lecture-room was granted, in accordance with previous custom, to an association consisting principally of persons connected with the several departments of government to give a course of lectures in aid of a benevolent object. The privilege was granted, as usual, on the condition definitely expressed, that subjects of sectarianism in religion and special politics should not be discussed. But in this case experience proved that it is injudicious to allow the use of the room in times of great public excitement for lectures over which the Institution has no immediate control.

The association could not, or at least did not, observe the restriction as to subjects, and the whole course became an exposition of political principles which were then under public discussion both in the papers of the day and on the floor of Congress. The evil of this was soon manifest in acrimonious attacks upon the Institution by members of Congress and editors of papers holding different political opinions. It was in vain to attempt to neutralize the effects of these attacks by stating the fact that the Institution ought not to be held responsible for the character of these lectures; the public could not be made to recognize the distinction between the lectures given under the immediate sanction of the Institution and those which were permitted to be delivered in the lecture-room under the direction of other parties.

Upon these considerations and those mentioned in the last report as to the inexpediency of frequently opening the Smithsonian building at night in the present state of this city, I concluded, after the course of political lectures was terminated, to restrict the use of

the lecture-room exclusively to the lectures given under the immediate auspices of the Institution. This rule at first gave offence to some of the friends of the Institution, and was considered very unjust by another association which desired to give a course of political lectures in opposition to those which had been previously delivered. It has since, however, been generally approved by the reflecting public, and, indeed, must commend itself to all who have studied the history of establishments under the direction of State or national governments. Unless they are strictly guarded against the intrusion of political influence, their permanency and usefulness cannot long be maintained. So much were the Regents composing the Board, at its first sessions, impressed with this fact, that, at one of their early meetings, they unanimously adopted the following suggestion of one of their committees, namely:

"The party politics of the day, on which men differ so widely and so warmly, should not, your committee think, enter among the subjects treated of in any lecture or publication put forth under the sanction of the Institution. And they would deeply regret to see party tests and party wranglings obtrude themselves on the neutral grounds of science and education, endangering, as such intrusion surely would, the tranquillity of the Institution, disturbing the even tenor of its action, perhaps assaulting its welfare, and certainly contracting the sphere of its usefulness."

I need not say to the gentlemen now present, some of whom have been Regents since the beginning, how strictly the spirit of this resolution has been observed; notwithstanding the members of the Board from the two Houses of Congress are designedly elected from those holding opposite political opinions, in this hall the irritations of legislative discussion have been allayed or forgotten, and men of the most extreme political views have constantly met in this place as on a common ground of friendly sympathy, actuated apparently by no other feeling than the desire to guide and sustain the Institution in its mission of advancing and diffusing knowledge.

To make up for the dissatisfaction which might be felt on account of the restriction which had been put upon the use of the lecture-room, it was thought advisable to give in the winter of 1862–'63 a more extended series of lectures than had been given in the two preceding winters, but to confine them principally to courses on scientific and other subjects, which might be of service to those who desired actual

instruction rather than mere amusement; although the attendance was not as large as in the case of the single lectures or the more exciting topics of the day, yet it was well maintained and comprised an attentive and decorous audience.

The following are the courses which were delivered, namely:

A course of six lectures, by Professor Daniel Wilson, of the University of Toronto, on "Unwritten History," embracing, 1st, Archæology; 2d, Physiology; 3d, The Lettered Races; 4th, The Maritime Races; 5th, The Origin of Civilization, and 6th, The Historic and Unhistoric Races.

A course of six lectures, by Professor Arnold Guyot, of Princeton College, on "The Unity of Plan in the System of Life, as exhibited in the characteristic ideas and mutual relations of the great groups of the vegetable and animal kingdom."

A course of five lectures, by Professor E. N. Horsford, of the Lawrence Scientific School, Cambridge, on "Munitions of War."

A course of six lectures, by Professor John Torrey, of New York, on "Artificial Light."

A course of four lectures, by Professor Henry Wurtz, of New York, on "Gunpowder."

Two lectures, by Dr. Solger, on "Ethnology."

One lecture by Arthur W. Edwards, on "The Microscope and its Revelations."

The courses of lectures by Professors Wilson, Guyot, and Wurtz will be published in the appendix to the report for 1862, and subsequent years.

Respectfully submitted.

JOSEPH HENRY,
Secretary Smithsonian Institution.

FEBRUARY, 1863.

APPENDIX TO THE REPORT OF THE SECRETARY.

SMITHSONIAN INSTITUTION,
Washington, December 31, 1862.

SIR: I beg leave herewith to present a report, for 1862, of the operations intrusted to my charge, namely, those relating to printing, exchanges, and natural history.

Very respectfully, your obedient servant,

SPENCER F. BAIRD,
Assistant Secretary Smithsonian Institution.

Prof. JOSEPH HENRY, L.L.D.,
Secretary Smithsonian Institution.

PRINTING.

In an appendix will be found a list of the works published in 1862—the number of pages printed, quarto and octavo, greatly exceeding that reported for 1861. Several large works are also in press and will be issued early in 1863.

The following enumeration will show the number of pages printed during the year:

Works completed and issued, quarto.....pages..	1,390		
octavo.....pages..	1,226		
			2,616
Works still in press, quarto.....pages..	180		
octavo.....pages..	593		
			773
Total.....			3,389

A complete catalogue of all works published by the Institution up to June, 1862, was issued during the year, and will be found included in the list of articles published.

All the octavo publications of the Institution hitherto issued, and of which copies enough were on hand, have been arranged in a regular series, entitled "Smithsonian Miscellaneous Collections," corresponding to the "Smithsonian Contributions to Knowledge," and fill four volumes of over seven hundred pages each. An accompanying list shows the contents of these several volumes.

EXCHANGES AND TRANSPORTATION.

The operations in the department of exchanges, as reported for 1861, showed a considerable reduction below those of the previous year. During 1862, however, they have fully recovered their usual magnitude, and while the receipts of books and parcels from abroad are nearly equal to the maximum of any previous year, the transmissions have been greater than usual.

The thanks of the Institution and its correspondents continue to be due to various companies for their great liberality in transporting boxes and parcels free of charge over their respective routes, thereby reducing very materially the expenses of the department of exchanges. The lines deserving of especial mention are the North German Lloyd, between Bremen and New York; the Hamburg and New York steamship line; the Cunard lines, running from New York; the Panama Railroad Company; the Pacific Mail Steamship Company; the Adams's Express Company; the Hudson Bay Company, &c. The magnitude of the favors thus conferred may be readily understood by stating that a single transmission of packages to Germany during the year, through the North German Lloyd, consisted of 46 boxes of 424 cubic feet, or over ten tons by measurement.

The Institution is under many obligations for important services rendered in connexion with its exchanges and transportation, to the Hon. Hiram Barney, collector of customs in New York, and his assistant, Mr. George Hillier. Also in San Francisco, to Mr. A. B. Forbes, and Mr. Samuel Hubbard, of the Pacific Mail Steamship Company's service. The foreign agents of the Institution, Dr. Felix Flügel, of Leipsic; Gustave Bossange & Co., Paris, and Mr. William Wesley, 2 Queen's Head Passage, Paternoster Row, London, continue to discharge their duties with promptness and efficiency.

The following tables exhibit the statistics of the different branches of the system of exchanges:

A.

Receipt of books, &c., by exchange in 1862.

Volumes:		
Octavo	1,211	
Quarto	348	
Folio	52	
		1,611
Parts of volumes and pamphlets:		
Octavo	2,441	
Quarto	767	
Folio	161	
		3,369
Maps and charts		55
Total		5,035
Receipts in 1861		2,886
Excess in 1862		2,149

B.

Table showing the statistics of the exchanges of the Smithsonian Institution in 1862.

Agent and country.	Number of addresses.	Number of packages.	Number of boxes.	Bulk of boxes in cubic feet.	Weight of boxes in pounds.
Dr. F. FLÜGEL, *Leipsic*—					
Scandinavia	1	1			
Sweden	14	22			
Norway	6	11			
Denmark	13	23			
Russia	37	60			
Holland	40	52			
Germany	262	346			
Switzerland	31	47			
Belgium	16	23			
Total	420	585	46	424	12,780
G. BOSSANGE & Co., *Paris*—					
France	114	152			
Italy	64	86			
Spain	7	14			
Portugal	4	5			
Total	189	257	20	183	5,356
W. WESLEY, *London*—					
Great Britain and Ireland	166	259	16	159	4,700
Rest of the world	71	102	32	240	6,000
Grand total	846	1,203	114	1,006	28,836

C.

Addressed packages received by the Smithsonian Institution from parties in America for foreign distribution in 1862.

	Number of packages.
Albany, N. Y.—	
New York State Agricultural Society	28
Boston, Mass.—	
American Academy of Arts and Sciences	106
Massachusetts Historical Society	1
Massachusetts School for Idiotic and Feeble-minded Youth	3
Dr. C. T. Jackson	1

Cambridge, Mass.—	
Harvard College	12
Prof. L. Agassiz	50
Prof. Asa Gray	30
Prof. J. Marcou	3
Cleveland, Ohio—	
Dr. J. S. Newberry	73
Columbus, Ohio—	
Ohio State Board of Agriculture	126
Leo Lesquereaux	15
Dorchester, Mass.—	
Dr. Jarvis	20
Georgetown, D. C—	
Dr. L. Mackall	10
Leon, N. Y.—	
T. A. Cheney	100
Madison, Wisc.—	
Historical Society of Wisconsin	2
State of Wisconsin	73
Montpelier, Vt.—	
State Library of Vermont	24
Montreal, Can.—	
Prof. J. W. Dawson	10
New Haven, Conn.—	
American Journal of Science	35
Prof. J. D. Dana	15
New York.—	
New York Lyceum of Natural History	82
Philadelphia, Pa.—	
Academy of Natural Sciences	190
American Philosophical Society	196
Entomological Society of Philadelphia	12
Pennsylvania Institute for the Blind	36
Dr. Isaac Lea	20
Franklin Peale	3
A. F. Ward	25
William Sharswood	20
Providence, R. I.—	
State of Rhode Island	8
St. Louis, Mo.—	
St. Louis Academy of Sciences	8

Toronto, Can.—	
Canadian Institute	4
Washington, D. C.—	
Topographical Bureau	228
United States Coast Survey	50
United States Senate	250
Gen. A. A. Humphreys	75
Total	1,944

D.

Addressed packages received by the Smithsonian Institution from Europe for distribution in America, in 1862.

	Number of packages.
Albany, N. Y.	
Albany Institute	3
Dudley Observatory	9
New York State Agricultural Society	28
New York State Library	21
New York State Medical Society	1
New York State University	2
Professor James Hall	14
Amherst, Mass.	
Amherst College	6
Annapolis, Md.	
State Library	5
Ann Arbor, Mich.	
Detroit Observatory	4
Dr. Brunnow	7
Mr. Watson	1
Augusta, Me.	
State Library	4
Baltimore, Md.	
Maryland Historical Society	7
Peabody Institute	1
Dr. J. O. Morris	2
Mr. Uhler	2
Blackwell's Island, N. Y.	
New York City Lunatic Asylum	1
Bogota, New Granada.	
Sociedad de Naturalistas Neo Grenadinos	2
Boston, Mass.	
American Acad'y of Arts and Sciences	114
American Statistical Association	3
Boston Society of Natural History	76
Bowditch Library	3
Historic Genealogical Society	1
Massachusetts Historical Society	1
Prison Discipline Society	1
Public Library	8
State Library	6
Boston Journal of Natural History	1
North American Review	3
F. Alger	1
Dr. Brewer	3
A. A. Gould	2
Dr. E. Jarvis	1
Dr. Wilson	1
Brattleboro', Vt.	
Vermont Asylum for Insane	1
Brunswick, Me.	
Bowdoin College	7
Historical Society of Maine	1
Mrs. Parker Cleaveland	1
Burlington, Iowa.	
Historical and Genealogical Institute	1

D.—*Addressed packages received by the Smithsonian Institution, &c.*—Continued.

	Number of packages.
Burlington, Vt.	
University of Vermont	4
Cambridge, Mass.	
American Association for the Advancement of Science	32
Cambridge Observatory	17
Harvard College	15
Editor of Astronomical Journal	5
Professor L. Agassiz	39
G. P. Bond	4
Professor H. J. Clarke	3
Dr. B. A. Gould	14
Professor Asa Gray	13
Th. Lyman	1
Professor Jules Marcou	3
C. E. Norton	1
Professor B. Peirce	8
E. Schubert	1
J. E. Worcester	2
Dr. J. Wyman	3
Chicago, Ill.	
Academy of Sciences	2
Mechanics' Institute	3
Col. J. D. Graham, U. S. A	7
Chuquisaca, Bolivia.	
University of Chuquisaca	1
Cincinnati, Ohio.	
Astronomical Observatory	1
Historical and Philosophical Society of Ohio	1
Mercantile Library	4
Observatory	3
Western Academy of Science	1
Editor of the Dental Register of the West	1
Professor Mitchell	3
Clinton, N. Y.	
Dr. C. H. F. Peters	3
Columbia, Mo.	
Geological Survey of Missouri	5
Columbia, Pa.	
Professor S. S. Haldeman	2
Dr. Melsheimer	1
Columbus, Ohio.	
Ohio State Board of Agriculture	53
State Library	5
Leo Lesquereaux	2
W. Sullivant	1
Concord, N. H.	
New Hampshire Asylum for Insane	1
New Hampshire Historical Society	1
State Library	6
Davenport, Iowa.	
Right Rev. Henry W. Lee	1
Des Moines, Iowa.	
State Library	20
Detroit, Mich.	
Michigan State Agricultural Society	20
Dorchester, Mass.	
Dr. E. Jarvis	4
Easton, Pa.	
Dr. B. Clemens	1
Professor J. H. Coffin	1
Erie, Pa.	
L. H. Olmsted	1
Fall River, Mass.	
Niels Arnzen	1
Farmington, Conn.	
Edw. Norton	3
Frankfort, Ky.	
Geological Survey of Kentucky	8
State Library	5
Mr. Shaffner	1
Gambier, Ohio.	
Kenyon College	7

D.—*Addressed packages received by the Smithsonian Institution, &c.*—Continued.

	Number of packages.
Georgetown, D. C.	
Georgetown College	12
Dr. A. Schott	2
Hanover, N. H.	
Dartmouth College	6
Harrisburg, Pa.	
Pennsylvania State Lunatic Hospital	1
State Library	7
Hartford, Conn.	
Hartford Society of Sciences	4
Historical Society of Connecticut	1
State Library	5
Young Men's Institute	3
Havana, Cuba.	
Observatoire Physique et Météorologique	1
Real Sociedad Economica	1
Hudson, Ohio.	
Western Reserve College	2
Indianapolis, Ind.	
Indiana Historical Society	1
State Library	5
Iowa City, Iowa.	
State of Iowa	9
State University of Iowa	33
Janesville, Wis.	
State Institution for the Blind	2
Jefferson City, Mo.	
Historical Society of Missouri	1
State Library	3
Kalamazoo, Mich.	
Asylum for Insane	1
Lancaster, Pa.	
Thomas C. Porter	2
Lansing, Mich.	
Agricultural College	1
State Library	5
Lecompton, Kansas.	
State Library	3
Leon, N. Y.	
T. Apoleon Cheney	1
Louisville, Ky.	
Colonel Long	2
Professor J. Lawrence Smith	1
Madison, Wis.	
Historical Society of Wisconsin	9
Skandinaviske Presse-Forening	1
State Library	6
Wisconsin State Agricultural Society	30
Montpelier, Vt.	
State Library	6
Montreal, Canada.	
Natural History Society	3
Dr. Smallwood	1
Nantucket, Mass.	
Miss Maria Mitchell	2
New Brunswick, N. J.	
Professor G. H. Cook	2
New Haven, Conn.	
American Journal of Science	25
American Oriental Society	20
Yale College	6
W. P. Blake	3
G. J. Brush	3
Professor J. D. Dana	34
Professor E. Loomis	10
Professor Silliman	21
Professor W. D. Whitney	4
New York, N. Y.	
American Agriculturalist	2
American Ethnological Society	2

D.—*Addressed packages received by the Smithsonian Institution, &c.*—Continued

	Number of packages.
New York, N. Y.—Continued.	
American Geographical and Statistical Society	30
American Institute	8
Astor Library	4
Mercantile Library Association	3
New York Historical Society	1
New York Lyceum of Natural History	65
University of the City of New York	8
New York Dental Journal	2
Farmer and Mechanic	2
New York Journal of Pharmacy	2
G. Boyd	1
Charles L. Brace	1
F. Delafield	1
Dr. Draper	1
Dr. D. C. Eaton	3
Thomas Egleston	13
Professor Wolcott Gibbs	1
S. H. Grant	1
H. Grinnell	2
Mr Harlan	2
Charles B. Norton	3
Baron Osten-Sacken	7
Professor Redfield	1
Professor Wynne	1
Norwich, Conn.	
Mr. Rockwell	1
Olympia, Wash. Ter.	
Territorial Library	3
Omaha, Nebraska.	
Territorial Library	3
Oswego, N. Y.	
Mr. Pumpelly	3
Philadelphia, Pa.	
Academy of Natural Sciences	142
American Philosophical Society	77
Central High School of Philadelphia	3
Franklin Institute	4
Geological Society of Pennsylvania	2
Geological Survey of Pennsylvania	1
Historical Society of Pennsylvania	5
Mercantile Library Association	1
Pennsylvania Hospital for the Insane	1
Pennsylvania Institute for the Blind	1
Wagner Free Institute	10

	Number of packages.
Philadelphia, Pa.—Continued.	
American Journal of Dental Science	1
Dental Cosmos	2
John Cassin	1
F. Clay	1
Dr. E. D. Cope	1
E. Durand	2
Dr. Hermann	1
H. S. Tanner	2
Professor F. L. Otto Koehrig	1
Dr. Isaac Lea	13
Dr. John Leconte	8
Dr. Joseph Leidy	14
George Ord	1
F. Peale	1
William Sharswood	5
Mrs. A. E. Thomas	1
Professor Wagner	1
Mr. Wetherell	1
Portland, Me.	
Neal Dow	1
Princeton, N. J.	
College of New Jersey	2
Professor A. Guyot	1
Providence, R. I.	
Brown University	1
Rhode Island Historical Society	1
State Library	4
Rio Janeiro, Brazil.	
Instituto Historico Geographico Brasiliero	2
Mr. Liais	1
Rochester, N. Y.	
Hon. Lewis H. Morgan	1
Rock Island, Ill.	
Dr. John Rittles	1
Sacramento, Cal.	
State Library	5
Salem, Mass.	
Essex Institute	2

D.—*Addressed packages received by the Smithsonian Institution, &c.*—Continued.

	Number of packages.
San Francisco, Cal.	
California Academy of Natural Sciences	31
Geological Survey of California	1
St. Louis, Mo.	
Deutsche Inst. für Bef. von Wiss. Kunst und Gewerbe	3
Geological Survey of Missouri	2
St. Louis Academy of Sciences	105
St. Louis University	5
Dr. George Bernays	1
Dr. George Engelmann	8
Dr. Hammer	1
Dr. Haven	1
Dr. Albert C. Koch	2
Dr. B. F. Shumard	7
G. C. Swallow	2
Santiago, Chile.	
Observatory	1
University of Chile	9
Springfield, Ill.	
State Library	5
Rev. L. P. Esbjörn	2
Stockton, Cal.	
Asylum for Insane	1
Toronto, Canada West.	
Board of Agriculture of Upper Canada	1
Canadian Institute	1
Trenton, N. J.	
Geological Survey of New Jersey	5
State Library	5
Utica, N. Y.	
American Journal of Insanity	3
New York State Lunatic Asylum	1
Valparaiso, Chile.	
Dr. T. A. Reid	1

	Number of packages.
Washington, D. C.	
Bureau of Ordnance and Hydrography	4
Library of Congress	9
National Observatory	87
Surgeon General U. S. Army	1
Topographical Bureau	1
Trigonometrical Survey	1
U. S. Coast Survey	35
U. S. Patent Office	138
War Department	3
Colonel Abert	2
Professor A. D. Bache	34
Professor S. F. Baird	6
W. D. Breckenridge	1
Major Emory	1
J. Ferguson	2
T. Gill	1
Captain J. M. Gilliss, U. S. N	37
Captain H. J. Hartstene, U. S. N	1
T. Hitz	1
Professor W. E. Jillson	1
Professor W. R. Johnson	1
J. C. G. Kennedy	3
Lieutenant S. P. Lee	2
F. B. Meek	3
Dr. J. S. Newberry	1
G. W. Riggs	2
H. R. Schoolcraft	5
Hon. W. H. Seward	1
W. Smyth	1
Prof. W. Stimpson	9
Hon. Charles Sumner	1
H. Ulke	2
Waterville, Me.	
Waterville College	2
Westchester, Pa.	
Dr. W. Darlington	1
West Point, N. Y.	
Professor Bailey	1
Worcester, Mass.	
American Antiquarian Society	9
State Lunatic Hospital	1
York, Pa.	
Rev. Mr. Zeigler	1

Total of addresses	273
Total of parcels	2,111

MUSEUM AND COLLECTIONS.

As might have been expected, the receipts of specimens of natural history during the year past have been materially curtailed. The entire number of donations in 1862 amounted to 124. The number for 1861 was 157, while that for 1860 was 404. Much of interest has, however, been received from different quarters, and the aggregate would have been more considerable if all the collections made in the Hudson Bay region by Mr. Kennicott, and other gentlemen, had not been kept back in consequence of the Indian outbreaks in Minnesota during the year.

Mr. Kennicott spent the spring and summer of 1861 at Fort Yukon, on the Yukon river, making large collections of specimens. He wintered on the Rocky mountains, at La Pierre's house, and made a visit to Fort Simpson early in the spring. News received there from home determined him to return to the United States, and he reached Fort Garry the beginning of September, arriving at Chicago in October, after an absence of three years and a half. A detailed report of his expedition will be prepared by himself, and submitted hereafter.

The gentlemen of the Hudson's Bay Company, of whom mention has heretofore been made as aiding him in every way, have continued their kind offices. To Governor Dallas, present governor of the Hudson's Bay Company, Governor Mactavish, Mr. Bernard R. Ross, Mr. Lawrence Clark, Mr. R. Mac Farlane, Mr. W. L. Hardisty, Mr. James Lockhart, Mr. C. P. Gaudet, Mr. James Flett, and others, the thanks of the Institution are very especially due for such aid to Mr. Kennicott as ensured the success of his expedition, and without which he could have accomplished little or nothing.

To most of the gentlemen above referred to acknowledgments have been made in previous reports for valuable contributions of specimens. Collections made by them in 1862, having been packed with those of Mr. Kennicott, have not yet arrived, but are expected early in the year 1863, as, at the last advices, they had reached St. Paul.

Mr. John Xantus, so well known on account of his scientific researches in California, in connexion with the Institution, has just entered into a new and entirely unexplored field, promising the most important results. Having been appointed United States consul at Manzanillo, he left New York on the 11th of December, and is doubtless now at his post. With their usual liberality, exercised so often before in the interest of science and the Smithsonian Institution, the Panama Railroad Company and the Pacific Mail Steamship Company gave free passage to him and his extensive outfit.

IDENTIFICATION OF SPECIMENS.

Much progress has been made by the various gentlemen mentioned on page 62 of the last report in identifying and labelling the collections of the Institution. It will not be long before the greater portion will be thoroughly worked up, and a general distribution of duplicates accomplished. No new collections of any importance have been given out, although Mr. Cope expects to take up the North American saurians belonging to the Institution with the view of preparing a report on the subject.

Dr. Allen having completed the examination of the American bats intrusted to him, as far as his professional engagements would allow, has returned the specimens, and deposited a report on the subject, nearly finished, and to be hereafter completed by him. Dr. Wood has also returned a portion of the collection of Myriapoda. Dr. Slack has sent back the collection of monkeys, with a catalogue of the collection. Mr. George N. Lawrence has labelled the entire

collection of humming birds, amounting to over 150 species. Professor Agassiz has determined and returned the collection of Echini.

Mr. Gill has continued his examinations of the fishes of Cape St. Lucas, collected by Mr. Xantus, and published many new species from them.

DISTRIBUTION OF SPECIMENS.

The distribution of duplicate specimens has been continued as fully as time and opportunity would allow. Several large collections of mammals, birds, and eggs have been sent off, together with a considerable number of sets of marine shells. Dr. Foreman has been engaged for some time in making up the duplicate Unionidae into series, of which about twenty sets will soon be ready.

WORK DONE IN THE MUSEUM.

The mounted mammals and birds which occupied the Museum Hall at the beginning of the year have all been identified, and to most of them neatly written labels have been affixed. This portion of the work will be completed as soon as the clerk assigned to the duty can accomplish it. All the specimens have been carefully examined, and those attacked by insects have been removed and baked or exposed to the vapor of benzine. A few skins have been mounted of species possessing a particular interest.

The collection of skulls has been cleaned and rearranged in the southeast gallery. The series of rocks, and in part that of minerals, have been placed on their proper shelves. Nothing further has been done with the shells, the collections in this department not having been returned by the gentlemen having them in charge.

All the miscellaneous boxes of specimens in the Institution have been unpacked and their contents assorted and distributed. All the crude material in the building has thus been put into condition for examination, and given out to investigators for arrangement, with the exception of a portion of the fossils and the general ethnological collection. These will, however, all be unpacked and examined in the ensuing year.

The progress of work upon the collections already in the Institution at the beginning of the year was much interfered with by the necessity of receiving a large number of specimens formerly belonging to the National Institute, and sent from the Patent Office (where they had been stored) by the Commissioner of Patents. Much of this material was in an exceedingly damaged condition, requiring instant attention and much labor to preserve it in even tolerable condition.

The cataloguing of specimens in the record books of the Institution has been carried forward during the year by the insertion of nearly 10,000 additional entries, many of them covering each a number of specimens. The present aggregate of entries is about 75,000, embracing at least 500,000 or half a million of specimens. When it is remembered that none of the plants, and insects, and but few of the fishes and invertebrates, have yet been recorded in this way, some estimate may be formed of the extent and value of the material for research in charge of the Smithsonian Institution.

Table showing the total number of entries on the record books of the Smithsonian collection at the end of the years 1861 *and* 1862.

	1861.	1862.
Skeletons and skulls	4,459	4,750
Mammals	5,550	5,900
Birds	23,510	26,157
Reptiles	6,088	6,311
Fishes	3,643	4,925
Eggs of birds	4,830	6,000
Crustaceans	1,287	1,287
Mollusks	9,718	10,000
Radiates	1,800	2,675
Fossils	1,031	2,100
Minerals	3,500	3,725
Ethnological specimens	550	825
Annelids	105	109
Total	66,075	74,764

LIST OF DONATIONS TO THE MUSEUM IN 1862.

Agassiz, Professor L.—Skins and eggs of birds from Labrador: specimens of *Haemulon.*

Akhurst, James.—Bat and crustaceans from South America.

Barnston, George.—Birds, fishes, &c., from Lake Superior.

Beadle, Rev. E. R.—Box of minerals.

Beitel, C. G.—Minerals and furnace slags from Pennsylvania.

Berthoud, Dr. E. L.—Minerals, fossils, and skin of *Lagopus leucurus.* Pike's Peak.

Bertolet, Dr. P. G.—Sections of wood of trees of Pennsylvania.

Bickmore, A. J.—Living *Phæton flavicauda,* from Bermuda.

Blackman, Mr.—Series of specimens of prairie chicken or pinnated grouse, from youngest chick to adult. Also skins of other birds, insects, eggs, &c., from Illinois.

Bland, Thomas.—West Indian shells.

Brandt, H.—Nests and eggs from Fort Riley.

Brush, G. J.—Box of minerals.

Buckner, Dr.—Set of models of edible fungi, prepared at Hildburghausen.

Cardeza, Dr.—Series of choice minerals from Pennsylvania.

Carlton, U. S. A., General J. H.—Skull of rattlesnake, from New Mexico.

Carothers, Rev. A. G.—Collection of reptiles from Martinique.

Chapman, N. H.—Box of birds' nests, from Ohio.

Cochran, T. G.—Eggs of Night Heron.

Cook, Prof. George H.—Fossils of New Jersey.

Cooper, Wm.—Fossils from the Isthmus of Panama. Cast of *Megalonyx* bones.

Couper, W.—Skins of *Aegiothus,* from Canada.

Cowles, P. M.—Insects from Cumberland Gap.

Dawson, Prof. J. W.—Postpliocene fossils, from Canada.

Dow, Captain J. M.—Mammals, birds, and other animals, from Nicaragua.

Skins of birds, and various alcoholic specimens, collected at sea between New York and Panama, *via* Cape Horn.

Eaton, Dr. H. K.—Specimens of *Gryllotalpa.*
Edwards, A. M.—Mounted infusoria from Washington Territory.
Egleston, Thos.—Minerals from Massachusetts.
Elliot, D. G.—Four skins of European birds.
Feilner, Lieut. John.—Mammals, birds, &c., from Fort Crook, California.
Foreman, Dr. E.—Fossil tracks of animals from Maryland.
Forns, R. M.—Two skins of *Chordeiles minor*, Cuba.
Geoffroy, Mons.—Collections of birds from Bogota.
Gibbs, George.—Shells and fossils from Washington Territory
North American antiquities. (Deposited.)
Gilliss, U. S. N., Captain J. M.—Package of poisoned arrows brought from the Amazon by Lieutenant Herndon; Coral from Agatha's Bank.
Goss, B. F.—Nests and eggs of birds, from Kansas.
Gundlach, Dr. J.—Box of Cuban birds.
Gurley, R. R.—Golden eagle in the flesh, shot near Washington.
Habel, Dr. H.—Minerals from New York Island.
Hayden, Dr. F. V.—Fossils from Maryland and New Jersey.
Hayes, Dr. I. I.—Esquimaux dresses and other curiosities; Birds, mammals, and rocks, from North Greenland.
Heermann, Dr. A. L.—130 species and 250 specimens of Humming birds; *Vireo barbatula*, from Florida.
Hepburn, James.—Birds' eggs, from Pacific coast of North America
Hubbard, Samuel.—Thirty species of Californian fishes.
Hunt, U. S. A., Captain E. B.—*Hippa*, from Key West.
Kennicott, R.—Box of eggs and skins of mammals and birds from the Yukon river.
Lawrence, George N.—*Hylophilus*, from Guatemala; Mounted *Macrorhamphus scolopaceus.*
Lea, Isaac.—Box of *Unionidæ.*
Leonard, J.—Minerals from the Rocky Mountains.
Lewis, James—Large collection of land and fresh-water shells of United States, including selected series of *Paludina.*
Lewis, Joseph S.—Coleopterous insects, from United States.
Lowcree, T., per *J. J. Major.*—*Pityophis*, from Guadalaxara.
M'Kenzie, J.—Birds from Moose Factory.
Major, J. J.—Eggs of *Pandion*, from the Similkameen.
March, W. T.—Series of birds of Jamaica.
Matthews, G. F.—Fossil shells of New Brunswick.
Meek, F. B.—Fossils from Maryland and New Jersey.
Mendenhall, Kirk.—Eggs of birds and fossils of Indiana.
Moses, Dr. S. G.—Living Duck-Hawk, hatched in Connecticut.
Newton, Alfred.—Thirty species of eggs of Arctic European birds.
New York; Panama R. R. Co.—Series of fossils from Isthmus of Panama.
Palmer, Dr. Edward.—Shells from Acapulco and San Diego.
Paris; Mus. d'Hist. Nat.—Series of serpents from various localities.
Parkinson, D. F.—Mammals, birds, &c., from North California.
Pease, W. H.—Shells from the Sandwich Islands.
Philadelphia Academy of Natural Sciences.—Specimens of *Rissa* and *Otus.*
Pierce, Warren.—*Asellus*, from Ohio.
Poey, Prof. F.—Fishes of Cuba.
Ried, Dr. A.—Skeletons, skulls, and antiquities of Patagonian and Araucanian Indians.
Reinhardt, Dr. J.—Box of European birds.
Ross, B. R.—Bale of large skins from Prince Rupert's Land.
Russell, Dr. W. H.—Seven species of Himalayan pheasants.

Samuels, E.—Series of infusorial slides.
Schenectady; Union College.—Box of minerals.
Schiffmann, R.—Insects from Missouri.
Schmid, Dr. H. E.—Reptiles, &c., in alcohol, from Japan; also living *Megalobatrachus*, or Giant Salamander.
Sclater, P. L.—Seventy-five species of Jamaican birds.
Scott, Ansel.—Indian relics from Bradford county, Pennsylvania.
Simpson, Jos.—Copper spear head and other relics.
Stone, C. J.—Box of minerals.
Swan, James G.—Skins of birds, crustaceans, shells, &c., Straits of Fuca.
Swift, D.—Minerals and Indian remains from Pennsylvania.
Thomsen, J. H.—Skeleton of sperm-whale porpoise, Nantucket; *Echinarachrus*, from New Bedford.
Tolman, J. W.—Birds' eggs from Illinois.
Totten, General Joseph G.—Coral from the Tortugas.
Totten, Colonel.—Fossils from line of Panama railroad.
Tryon, George W.—Type specimens of new shells; box of *Unionidæ*.
Van Cortlandt, Dr.—Fishes from the Ottawa river.
Washington; National Institute.—Four cartloads of miscellaneous specimens.
Whittlesey, E.—Coal from Ohio.
Williamson, Sergeant J. J., (company E, 2d New York artillery.)—Snowy owl, shot near Washington.
Willis, J. R.—Shells, fishes, birds, eggs, &c., of Nova Scotia.
Wingate, J. D.—Box of *Helices*, from Pennsylvania.
Wood, Dr. William.—Living Duck Hawk, from Connecticut; also skins of birds, eggs, and Indian remains.
Woodworth, Dr. J. M.—Shells, eggs, &c., from Iowa.
Wright, W. W.—Fossil wood, found five miles from Alexandria.
Wurdemann, W.—Shells of Florida, (deposited.)
Wyrick, David.—Bones of man and animals from ancient graves in Ohio.

LIST OF SMITHSONIAN PUBLICATIONS DURING 1862.

Discussion of the Magnetic and Meteorological Observations made at the Girard College Observatory, Philadelphia, in the years 1840—1845, by A. D. Bache, LL.D. First Section, Part II. Investigation of the Solar-Diurnal Variations of the Magnetic Declination and its Annual Inequality. June, 1862. 4to., pp. 28.

Discussion, &c. First Section, Part III. Investigation of the Lunar Effect on the Magnetic Declination. June, 1862. 4to., pp. 16.

Discussion of the Magnetic and Meteorological Observations, &c., continued. Second Section, comprising Parts IV, V, VI. Horizontal Force, Investigation of the Ten or Eleven Year Period and of the Disturbances of the Horizontal Component of the Magnetic Force; Investigation of the Solar-Diurnal Variation and of the Annual Inequality of the Horizontal Force; and of the Lunar Effect on the Same. November, 1862. 4to., pp. 76.

Monograph of the Diptera of North America. Prepared for the Smithsonian Institution by H. Loew. Part I. Edited, with additions, by R. Osten Sacken. April, 1862. 8vo., pp. 246, with fifteen wood-cuts and two plates.

Synopsis of the described Lepidoptera of North America. Part 1. Diurnal and Crepuscular Lepidoptera. Compiled for the Smithsonian Institution by John G. Morris. February, 1862. 8vo., pp. 376, and thirty wood-cuts.

Museum Miscellanea, or Aids to the Labelling, Cataloguing, and Recording of Specimens. 8vo., 1854—1862, pp. 48. This contains—

1. Abbreviations of names of States and Territories of North America, for labelling insects, shells, &c.
2. A series of small figures, from 1 to 1643.
3. A series of medium figures, from 1 to 2747.
4. A series of large figures, from 1 to 2599.
5. Blank check list of specimens.

Catalogue of Publications of the Smithsonian Institution, corrected to June, 1862. 8vo., pp. 52.

List of Foreign Institutions in correspondence with the Smithsonian Institution. 1863. 8vo., pp. 40.

Results of Meteorological Observations made under the Direction of the United States Patent Office and the Smithsonian Institution, from the year 1854 to 1859, inclusive; being a Report of the Commissioner of Patents to the Senate, at the first session of the 36th Congress. Vol. I. 1862. 4to., pp. 1270. (Vol. II is in press.)

Annual Report of the Board of Regents of the Smithsonian Institution, showing the operations, expenditures, and condition of the Institution for the year 1861. 8vo., pp. 464.

WORKS PARTLY PRINTED IN 1862, BUT NOT COMPLETED.

Meteorological Observations in the Arctic Seas. By Sir Francis Leopold M'Clintock, R. N. Made on board the Arctic searching yacht "Fox," in Baffin's Bay and Prince Regent's Inlet, in 1857, 1858, and 1859. Reduced and discussed by Charles A. Schott, Assistant U. S. Coast Survey. 4to., with one Map.

Notices of Ancient Mining on Lake Superior. By Charles Whittlesey. 4to.

Check List of Minerals, with their Symbols. Prepared for the Smithsonian Institution by T. Egleston, Jr. 8vo.

Synonymical List of the Coleoptera of North America, with Descriptions of New Species. By John L. Le Conte, M. D. 8vo.

Bibliography of American Conchology. By W. G. Binney. 8vo.

Synopsis of North American Air-breathing Shells. By W. G. Binney. 8vo.

Synopsis of North American Vivipara, &c. By W. G. Binney. 8vo.

WORKS CONTAINED IN THE FOUR VOLUMES OF MISCELLANEOUS COLLECTIONS.

Smithsonian Miscellaneous Collections. 1862. Vol. I, 8vo., pp. 732. Contains: (19.) Directions for Meteorological Observations; (87.) COFFIN, Psychrometrical Tables; and (31.) GUYOT, Meteorological and Physical Tables.

Smithsonian Miscellaneous Collections. 1862. Vol. II, 8vo. pp. 692. Contains: (27.) BOOTH AND MORFIT, Recent Improvements in Chemical Arts; (115.) Proceedings Board Regents Smithsonian Institution in relation to the Electro-magnetic Telegraph; (53.) STANLEY, Catalogue Portraits North American Indians; (108.) BAIRD, Catalogue of North American Birds; (49.) BAIRD AND GIRARD, Catalogue of North American Reptiles—Serpents; (128.) Check List Shells, North America; (34.) Directions for Collecting; (137.) Circular to Officers H. B. Co.; (139.) Instructions for collecting Nests and Eggs; North American Grasshoppers; and North American Shells; (138.) MORGAN, Circular respecting Relationship.

Smithsonian Miscellaneous Collections. Vol. III, 8vo., pp. 766. Contains: (102.) OSTEN SACKEN, Catalogue Diptera North America; (118) MORRIS, Catalogue Described Lepidoptera North America; (136.) LE CONTE, Classification Coleoptera, I; (117.) Catalogue Publications of Societies in Smithsonian Library.

Smithsonian Miscellaneous Collections. Vol. IV, 8vo., pp. 752. Contains: (134.) HAGEN, Synopsis of North American Neuroptera, and (133.) MORRIS, Synopsis of North American Lepidoptera.

LIST OF METEOROLOGICAL STATIONS AND OBSERVERS

OF THE

SMITHSONIAN INSTITUTION

FOR THE YEAR 1862.

BRITISH AMERICA.

Name of observer.	Station.	North latitude.	West longitude.	Height.	Instruments.*	No. of months received.
		° ′	° ′	*Feet.*		
Acadia College	Wolfville, Nova Scotia	45 06	64 25	95	A.	10
Baker, J. C	Stanbridge, Canada East	45 08	73 00		T.	12
Clarke, Lawrence, jr	Fort Rae, Great Slave Lake				T.	9
Craigie, Dr. W	Hamilton, Canada West	43 15	79 57		B T	12
Delaney, Edward M. J	Colonial Building, St. John's, Newfoundland.	47 35	52 40	170	B. T R.	7
Fleet, Andrew	Fort Norman, Hudson's Bay Territory.	64 00	124 00	200	T. R	5
Dickson, Walter	Little Whale River, Hudson's Bay Territory.	56 02		12	T.	11
Hall, Archibald, M. D	Montreal, Canada East	45 30	73 36	57	A.	12
Hensley, Rev. J M Everett, Prof. J. D	King's College, Windsor, Nova Scotia.	44 59	64 07	200	A.	3
Kirby, Rev. W. W	Fort Simpson, Hudson's Bay Territory.	61 51	121 25		T.	4
Magnetic Observatory	Toronto, Canada West	43 39	79 21	†108	A.	12
Mackenzie, John	Moose Factory, Hudson's Bay Territory.	51 15	80 45		B. T. R.	5
Phillips, H	Niagara, Canada West	43 09	79 20	270	A.	3
Rankin, Colin	Michipicoton, Canada West	47 50	85 05		T.	8
Richards, Thomas	Kenogumissee, Hudson's Bay Territory.	49 50	84 00	1,000	T.	7
Smallwood, Dr. Charles	St. Martin, Isle Jesus, Canada E.	45 32	73 36	118	A.	9

CALIFORNIA.

Name of observer.	Station.	County.	North latitude.	West longitude.	Height.	Instruments.	No. of months received.
			° ′	° ′	*Feet.*		
Ayres, W. O., M. D	San Francisco.	San Francisco.	37 48	122 27	130	A.	12
Belcher, W. C	Marysville	Yuba	39 29	121 30	80	B. T. R.	12
Dunkum, Mrs. Elizabeth S.	Honcut	Yuba	39 25	121 30		T. R.	12
Hays, W. W., M. D	Presidio of San Francisco.	San Francisco	37 48	122 26	150	A.	3
Logan, Thomas M., M. D	Sacramento	Sacramento	38 35	121 28	41	A.	12
Smith, M. D	Spanish Ranche	Plumas	39 56	120 40	3,700	B. T. R.	3
Whitlock, James H	Meadow Valley	Plumas	40 20	120 15	3,700	B. T. R.	1

* A signifies Barometer, Thermometer, Psychrometer, and Rain Gauge.
B signifies Barometer.
T signifies Thermometer.
P signifies Psychrometer.
R signifies Rain Gauge.
N signifies No instrument.
† Above Lake Ontario.

REPORT OF THE SECRETARY.

To the Board of Regents:

GENTLEMEN: I have the honor to present, at the commencement of another session of your honorable board, the annual report of the condition and transactions of the Smithsonian Institution during the year 1863.

The general operations of the Institution are so uniform from year to year that the several annual reports can differ but little from each other; the usual order will, therefore, be observed in this communication, with only such variations as the special incidents of the year may require.

It will be seen by the report of the Executive Committee that the finances of the Institution are in as favorable a condition as the state of public affairs would authorize us to expect. First. The whole amount of money originally derived from the bequest of Smithson is still in the treasury of the United States, bearing interest at six per cent., paid semi-annually, and yielding $30,910. Second. Seventy-five thousand dollars of an extra fund are in bonds of the State of Indiana, at five per cent. interest, also paid semi-annually, yielding $3,750. Third. Fifty-three thousand five hundred dollars of the same fund are in bonds of the State of Virginia, twelve thousand in those of Tennessee, and five hundred in those of Georgia, from which nothing has been derived since the commencement of the war. Fourth. A balance of upwards of $32,000 is now in the hands of the treasurer of the Institution.

The unsettled accounts at the close of the year do not exceed two thousand dollars.

From this statement it appears that the Institution, after erecting a building, accumulating a large library and an extensive museum, supplying the principal museums of the world with specimens of natural history, and publishing a series of volumes which have been distributed to all first-class libraries abroad, and still more extensively at home, has upwards of one hundred thousand dollars in addition to the money received from the original bequest. In addition to this, the stocks of Virginia and Tennessee are quoted at about half

their par value, and it may be a question whether they should not be disposed of and the money otherwise invested.

A part of the original bequest, amounting to £5,015, was left by Mr. Rush in England, as the principal of an annuity to be paid to the mother of the nephew of Smithson. The annuitant having died, a power of attorney was sent, in November, 1862, to Messrs. Fladgate, Clark & Finch to collect the money; but it has not yet been received. Although the whole legacy was awarded to Mr. Rush in behalf of the United States, after an amicable suit in chancery, various objections have been raised to allowing the small remainder to be sent to this country. These objections appear to be principally of a technical character, and are scarcely compatible with an equitable interpretation of the facts of the case. There should be no prejudice in England in regard to the construction placed upon the terms of the bequest and the policy which has been adopted, since one hundred and sixty-nine institutions in Great Britain and Ireland are recipients of the Smithsonian publications and specimens of natural history, and have enjoyed the advantages of its system of international exchange.

Although the financial affairs of the Institution are still in a favorable condition, its ability to produce results is materially diminished on account of the advanced prices of labor and materials, and especially the high rate of exchange under which its foreign operations are necessarily conducted. Still, all parts of the general system have been carried on with less abatement than might have been expected, as will be seen from the following account of the various operations:

Publications.—The publications of the Institution, as stated in previous reports, consist of three series: 1st, Contributions to Knowledge; 2d, Miscellaneous Collections; and, 3d, Annual Reports.

The Contributions include memoirs, embracing the records of original investigations and researches, resulting in such new truths as are considered interesting additions to knowledge. Twelve volumes in quarto of this series have been published, and the thirteenth is nearly ready for distribution.

The Miscellaneous Collections include works intended to facilitate the study of the various branches of natural history, to give instruction as to the method of observing phenomena, and to furnish a variety of other matter connected with the progress of science. Of this series four large octavo volumes have been issued, and two more are nearly completed.

The Annual Reports to Congress consist, each, of an octavo volume of 450 pages. They contain the report of the Secretary on the operations and condition of the Institution, the proceedings of the Regents, and an appendix, giving a synopsis of the lectures delivered at the Institution, extracts from correspondence, and articles of a character suited to meteorolcgical observers, to teachers, and other persons especially interested in the promotion of knowledge.

The thirteenth volume of the Contributions has been completed, and is now in the hands of the binder. It contains the following original papers:

1. Tidal Observations in the Arctic Seas; by Elisha Kent Kane, M. D; made during the second Grinnell Expedition in Search of Sir John Franklin in 1853–55. Reduced and discussed by Charles A. Schott, assistant United States Coast Survey.

2. Meteorological Observations in the Arctic Seas; by Sir Leopold McClintock; made on board the Arctic searching yacht "Fox" in Baffin's Bay and Prince Regent's Inlet in 1857–'59. Reduced and discussed by Charles A. Schott, assistant United States Coast Survey.

3. Ancient Mining on the shores of Lake Superior. By Charles Whittlesey.

4. Discussion of the Magnetic and Meteorological Observations made at the Girard College Observatory, Philadelphia, in 1840–'45. Part II. Investigation of the Solar-Diurnal Variation of the Magnetic Declination and its Annual Inequality. By A. D. Bache, Superintendent Coast Survey.

5. Part III. Investigation of the Lunar Effects of the Magnetic Declination. By A. D. Bache.

6. Parts IV, V, VI. Horizontal Force. Investigation of the ten or eleven year period, and of the disturbances of the horizontal component of the magnetic force; investigation of the solar-diurnal variation and of the annual inequality of the horizontal force, and of the lunar effect on the same. By A. D. Bache.

7. Records and Results of a Magnetic Survey of Pennsylvania and parts of adjacent States in 1840, 1841, with some Additional Records and Results of 1834, 1835, 1843, and 1862, and a Map. By A. D. Bache.

8. Researches upon the Anatomy and Physiology of Respiration in the Chelonia. By S. Weir Mitchell, M. D., and George R. Morehouse, M. D.

Accounts have been given in previous reports of all the papers contained in this volume, excepting that on the Chelonia. This

paper, by S. Weir Mitchell, M. D., and George R. Morehouse, M. D., of Philadelphia, is a very complete study of the anatomy and physiology of the breathing organs in turtles. It seems that, although at one time, and by a single observer, the true mode of the breathing of these animals was partially understood, it had long been neglected, and modern physiologists have taught that turtles forced air into the lungs as do frogs. Drs. Mitchell and Morehouse have shown that turtles breathe like mammals, by drawing air into the lungs by the aid of muscles situated in the flanks and on the outside of the lungs. Their paper contains a detailed account of the anatomy of the breathing organs of turtles, and is illustrated with numerous wood-cuts. The most novel discovery described by the authors is that of a chiasm or crossing from side to side of a portion of the nerves which supply the muscles of the larynx. Except the well-known facts as to similar crossings within the skull, no previous author has described any similar extra-cranial arrangement of nerves. The physiological uses of the laryngeal chiasm has been fully studied by Drs. Mitchell and Morehouse; and more recently Professor Wyman, led by their discovery, has described similar nerve arrangements in serpents and in certain birds.

The authors express their indebtedness to the Smithsonian Institution for the aid with which they were furnished in obtaining the requisite specimens for experiments and for dissection.

The following papers have been accepted for publication, and will form parts of the fourteenth volume of Contributions:

1st. Three additional parts of the series of discussion of the magnetic observations at Girard College, by Professor A. D. Bache.

2d. The result of a series of microscopical studies of the medulla oblongata, or the upper portion of the spinal marrow, by Dr. John Dean.

3d. A memoir on the palæontology of the Upper Missouri, by F. B. Meek and F. V. Hayden.

4th. An account of the photographical observatory and various experiments in regard to this subject, by Dr. Henry Draper, of New York.

5th. A monograph of the "Laridæ" or gulls, by Dr. Elliott Coues.

All these memoirs, except the last, are in the hands of the printer, or in process of illustration by the engraver.

In several of the preceding reports an account has been given of a series of reductions of the magnetic observations made from 1840 to 1845, inclusive, at Girard College, Philadelphia, by Professor Bache.

The first two of the papers of this series related to what is called the eleven-year period of the variation of the needle, which corresponds with the recurrence and frequency of the spots on the sun. The third paper relates to the influence of the moon on the variation of the needle. The fourth refers to the change in the horizontal part of the force of the earth's magnetism coinciding with the eleven-year period of the spots on the sun. The fifth relates to the effect of the sun in producing daily and annual variations in the horizontal component of the magnetic force. The sixth relates to the lunar influence on the horizontal magnetic force.

A particular account has been given of the result of all these investigations, which tend fully to corroborate the conclusions arrived at from observations in other parts of the world, that both the sun and moon are magnetic bodies, and exert an influence upon the polarity of the earth; and also that the magnetism of the sun has variations in intensity which are in some way connected with the appearance of spots on its surface, giving rise to the variations in those perturbations of the needle which have been called magnetic storms, and which present a periodical recurrence at an interval of about eleven years.

The influence of the moon is much less marked than that of the sun, and appears to be more analogous to the temporary magnetism induced in soft iron.

Parts VII, VIII, and IX of this series, now in the press, are a continuation of the same subject. Part VII contains the discussion of the effect of a change of temperature on the readings of the vertical force instrument.

If a magnetic needle could be supported perfectly free in space, so as to assume the direction into which it would be brought by the magnetic action of the earth, it would arrange itself in the line of what is called the dip, or the inclination of the needle. At the magnetic equator of the earth such a needle would be parallel to the horizon, but, departing from this line either to the north or the south, the inclination would increase continually until we arrive at the magnetic pole, when it would be vertical. It is plain that the full magnetic force of the earth, in the line of the dip, may be resolved into two others, viz., a horizontal force, or that which draws the ordinary magnetic needle back to the meridian when it has been deflected from this position; and, second, the vertical force which tends to draw the end of the needle down into the line of the dip. The fre-

quency of vibrations of a magnetic bar suspended by an untwisted thread, so as to be horizontal, gives the horizontal component of the force of the earth, while the vibrations of a similar bar placed in the plane of the dip, and poised horizontally like a scale-beam on two knife-edges, gives the variations in the vertical force. These vibrations, however, will be affected not only by the changes in the magnetism of the earth, but by that in the bar itself; and as the latter is affected by the temperature of the place, a series of observations and discussions was necessary to ascertain the corrections due to this cause. For this purpose the room was artificially heated and cooled; but the value of the correction was finally deduced from an investigation of the whole series of regular observations compared with the changes of temperature indicated by the hourly register of the thermometer.

The corrections for temperature were afterwards applied to all the observations. The larger disturbances were then separated from the body of the series in the same manner as had been done with regard to the horizontal force, by which means the effect of the monthly and yearly disturbance of the sun is exhibited analytically and graphically. From the results it appears that the number and aggregate amount of disturbances were least in 1844; that in each year the greatest number of disturbances occurs in March and September, and the least number in June, or, in other words, the maximum about the equinoxes, and the minimum about the solstices.

In an appendix to this paper the connexion of the appearance of the aurora borealis with the disturbances of the direction and force of the earth's magnetism is discussed. From the result of this discussion it appears that there is a periodicity of about eleven years in the recurrence of the frequency of the aurora, as well as in that of the great disturbances of the needle, and that these are coincident with each other and with the appearance of the spots on the sun.

The eighth part of the series gives the discussion of the daily and yearly variations due to the action of the sun on the vertical component of the magnetic force. The mean variation of the force is determined for each hour during each month and for the whole year, and also for the summer and the winter separately. These are expressed analytically and graphically, and an examination of the curve shows a principal maximum about 1 p. m., and a principal minimum about 9 a. m. There is an indication of a secondary maximum about 2 a. m., and a secondary minimum about 4 a. m.

In summer the curve appears to have but one greatest and one least ordinate occurring about noon and midnight. In winter the double feature of the curve becomes quite conspicuous.

The vertical force appears greater in May, June, July, and August, and less in the remaining months, with a range of about a hundred and five hundredth thousandth part of the whole force.

The ninth part gives the investigation of the influence of the moon upon the vertical force; also upon the direction and intensity of the total force. The methods of investigation are the same in this as in the preceding parts. The daily effects of the moon exhibit a principal maximum a little before the planet passes the upper meridian, and a principal minimum about three hours after it passes the lower meridian. The average epoch of the tide of vertical force is about one and a half hour in advance, apparently, of the culmination of the moon. A secondary variation of this force, though noticed, is very feeble. The subject of the time of greatest lunar disturbance is yet very imperfectly developed, and more observations in regard to it are desirable.

A comparison is also given in this paper between the observations made at Toronto and Philadelphia, and their accordances or differences are stated. The effect of the moon upon the direction and intensity of the total force is obtained by a combination of the vertical and horizontal components. From this part of the investigation it appears that the dip is greatest at 8 and 20 hours, and least at 3 hours and 13½, the range being equal to 3.6 seconds; and also that the maximum strength of the earth is greatest at half-past 12 and 11, and least at 7½ and 17 hours, the results, from the observations at Toronto and Philadelphia, being remarkably coincident.

The next paper of the foregoing list is that by Dr. Dean, which comprises the anatomy of the medulla oblongata, both human and comparative, from the lowest roots of the hypoglossal nerve, through the upper roots of the auditory, including the hypoglossal, nasal, glossopharyngeal, abducens, facial, and auditory nerves. The objects of the investigation were principally as follows:

1st. To illustrate the topography of the medulla oblongata by means of a series of photographs, which might completely map out all the principal changes in structure as they successively occur, connected with the development of the different nerves, with the details which accompany the development of their nuclei and accessory ganglia.

2d. The study of the more minute *histological* details, such as the course of the nerve roots, their entrance into their respective nuclei

and connexion with nerve cells, the connexion of the nuclei with each other by nerve fibres passing from the roots and from the nerve cells, the structure of the olivary bodies which possess a peculiar interest from their resemblance in convoluted structure to the cerebrum and cerebellum.

3d. An attempt to show, notwithstanding the apparent difference of structure between the spinal cord and medulla oblongata, a difference which appears very considerable at first sight, that the *plan* of structure of the two is identical, that the general arrangement of parts strictly corresponds, that the relation of the nerve roots to their nuclei or cell groups is the same, and moreover the connexion established between the different nuclei is carried out on the same plan. The illustrations for this work were taken by the author himself directly from the microscopic dissections by photography. For the general edition the photographic illustrations have been copied on stone with great care by L. H. Bradford. The steel plates were engraved by J. W. Watts. Besides these, a limited number of photographic prints from the original negatives have been prepared by Dr. Dean himself for private distribution, and from these negatives other copies may be obtained either on direct application to the author or through the medium of this Institution.

This paper, which is the result of over two years of constant study, was referred to Dr. W. A. Hammond, of the United States army, and Professor Jeffries Wyman for critical examination, and was recommended by them for publication as a valuable addition both to human and to comparative anatomy.

The third paper accepted for publication is on the Palæontology of the Upper Missouri, by F. B. Meek and F. V. Hayden.

This work contains figures and descriptions of all the known invertebrate fossil remains of the various geological formations of Idaho, Dakota, Nebraska, and portions of Kansas. About 370 species, nearly all of which are new, are fully described, and the descriptions are accompanied by remarks on the relations of each species to allied forms from other districts in this country and Europe, both living and fossil—its geological range, geographical distribution, &c. The illustrations consist of about one thousand carefully drawn figures, occupying forty-five quarto plates.

In addition to full descriptions of species, the work also contains extended accounts of all the genera to which these fossils belong, with the synonymy of each genus, and remarks on its affinities to other genera, both living and extinct; and assigns the probable period of

its introduction, the time when it appears to have attained its maximum development, and that at which it is supposed to have died out, if not represented in our existing seas. At the head of each generic description the etymology of the name and the type of the genus, when known, are given. Full descriptions of each of the families including these genera are likewise given ; and at the end of each family description the names of all the genera, whether living or extinct. The introduction contains detailed descriptions of the various formations in which these fossils existed, with remarks on their synchronism with other American and European deposits.

A considerable portion of the specimens described and figured were collected by Dr. F. V. Hayden in the several expeditions into the regions of the Upper Missouri and Yellowstone, sent by the government under the command of Lieutenant (now Major General) G. K. Warren, of the United States Topographical Engineers, to whose scientific zeal and liberal encouragement we are indebted for much of the material upon which the work is founded. But besides these, a large number were collected by Dr. Hayden himself previous to his connexion with the exploring expeditions of the government. The specific descriptions of the fossils described in this work are therefore to be regarded as appearing in the joint names of Meek and Hayden, while the descriptions of the genera, and families, and the discussion of their relations, geological range, geographical distribution, &c., are to be accredited to Mr. Meek alone.

The first sketch of this work was prepared as a part of the report to Congress of the explorations of the above-mentioned regions, but Mr. Meek has since devoted almost three years exclusively to extending and completing the investigations; and as it is probable that Congress will make no provision for its publication, it has been adopted by the Institution, at the earnest recommendation of several eminent naturalists, and will be published in successive parts. All the specimens described are in the collections of the Institution, and as soon as the work is completed the numerous duplicates will be distributed, as types of the species, to various scientific institutions at home and abroad.

Miscellaneous Collections.—Several series of articles forming parts of the Miscellaneous Collections, as stated in previous reports, have been undertaken, of which some have been completed, some are still in hand, and others have been printed during the past year.

The first of these series is that relating to the shells of North America, and will consist of the following works :

1. Check lists of North American shells, by P. P. Carpenter, &c.
2. Circular relative to collecting shells.
3. Elementary introduction to the study of conchology, by P. P. Carpenter.
4. List of the species of shells collected by the United States exploring expedition, by the same author.
5. Descriptive catalogue of the shells of the west coast of the United States, Mexico, and Central America, by the same author.
6. Descriptive catalogue of the air-breathing shells of North America, by W. G. Binney.
7. Descriptive catalogue of several genera of water-breathing fresh water univalves, by the same author.
8. Descriptive catalogue of the *Melaniadæ*, or the remainder of the water-breathing fresh water univalves, by George W. Tryon.
9. Descriptive catalogue of the *Corbiculadæ* or *Cycladidæ*, a group of bivalves principally inhabiting fresh water, by Temple Prime.
10. Descriptive catalogue of the *Unionidæ*, or fresh water mussels.
11. Descriptive catalogue of the shells of the eastern coast of the United States, by William Stimpson.
12. Bibliography of North American conchology, by W. G. Binney.
13. Check list catalogue of cretaceous and jurassic fossils of North America, by F. B. Meek.

The first and second articles of this list were published in 1860, and described in the report for that year. The third was published in 1861 as a part of the annual report for 1860. A new edition would have been printed before this time, as a part of the Miscellaneous Collections, had we not been disappointed by a delay in procuring the expected use of wood-cuts for the illustration of the work from the British Museum. We have just learned, however, that the Museum has liberally granted the use of these wood-cuts; that they are now being copied in stereotype in England; and consequently the work will be completed without further delay.

The fourth and fifth articles are still in the hands of Mr. Carpenter, who has reported progress, which leads us to expect that they will be ready for the press during the present year.

Of the 6th, 7th, and 8th, the first draughts of the manuscripts have been completed, and a preliminary sketch of the conclusions of the authors as regards the names of the species has been printed in the form of proof-sheets, and distributed to conchologists, with a view to elicit criticisms and suggestions prior to final publication.

Many important additions and corrections have been obtained in this way which will add much to the value of the works. The request has been made that these proof-sheets should not be considered as expressing the final views of the authors, but only intended to obtain the information above mentioned.

The ninth article of the series, by Mr. Prime, is well advanced in printing, and will be completed in 1864. In addition to the purely North American species, it will contain descriptions and wood-cut figures of those of Central and South America, as well as of the West Indies, thus embracing all the members of the family found in the New World.

The tenth and eleventh articles are still in process of preparation, and the engraving of the wood-cuts for their illustration has commenced.

The twelfth article—the first part of the Bibliography of North American conchology by Mr. Binney, mentioned in the last report as in press—has been completed and distributed. It forms a volume of 650 pages, and contains a list of the publications of American authors relative to conchology in general. As might reasonably be expected, some omissions have occurred of titles of papers overlooked or not met with, but copies have been sent to all the working conchologists of the country, with the request to furnish rectifications and additions to be inserted in an appendix to the second part. This second part, which is now in the press, is intended to include an account of the writings of foreign naturalists relative to American conchology, and will also contain, beside the additions and corrections of the first volume, copious indexes of authors and names of genera and species. About 250 pages are stereotyped, and the whole work, probably filling over 500 pages, will be finished during 1864.

The thirteenth article, check list by Mr. Meek, has been completed and put to press. It contains a list of all the species of cretaceous fossils described by authors up to the end of 1863, and will constitute an important aid in the labor of cataloguing and labelling collections, being prepared in the same style as that of the check-lists of North American shells, published by the Institution some years ago, which have been so much sought after by conchologists and amateurs.

Another series of works belonging to the miscellaneous collections is intended to facilitate the study of American insects. Of this series the several articles are as follows:

1. Instructions for collecting and preserving insects.

2. Catalogue of the described Diptera (flies, musquitoes, &c.) of North America, by Baron Osten Sacken.

3. Catalogue of the described Lepidoptera (butterflies, moths, &c.) of North America, by Dr. Jno. G. Morris.

4. Classification of the Coleoptera (beetles, &c.) of North America, by Dr. Jno. L. Le Conte.

5. Synopsis of the described Neuroptera (dragon-flies, &c.) of North America, with a list of the South American species, by H. Hagen.

6. Synopsis of the described Lepidoptera of North America, part I. Diurnal and Crepuscular Lepidoptera, by Dr. Jno. G. Morris.

7. List of the Coleoptera of North America, with descriptions of new species, by Dr. Jno. L. Le Conte.

8. Monograph of the Diptera of North America, by H. Loew, with additions, by Baron Osten Sacken.

9. Monographs of Homoptera and Hemiptera, (chinches, roaches, &c.,) of North America, by P. R. Uhler.

10. Descriptive Catalogue of the Hymenoptera, (bees, wasps, &c.,) of North America, by H. De Saussure.

These have all been described in previous reports.

Of No. 8, (monograph of Diptera,) the first part was published in 1862. During the past year the second part has been printed, and forms a volume of 339 pages. The manuscript of a third part is in an advanced state of preparation by Dr. Loew, and when received will, as in the case of the two preceding parts, be intrusted to Baron Osten Sacken for translation under his direction. We must again, in this connexion, express our obligations to Baron Osten Sacken for his valuable assistance in the preparation and publication of these works.

Of No. 9, monographs of Homoptera and Hemiptera of North America, by P. R. Uhler, the manuscript is nearly completed, and will soon be received from the author.

Of No. 10, the manuscript of the first part (Catalogue of Hymenoptera) was received from the author during the past summer, and placed in the hands of Mr. E. Norton, of New York, who kindly offered to translate it from the original French and superintend its publication. It is now in the press, and will soon be completed.

In addition to the publications relating to shells and insects, the following, belonging also to the Miscellaneous Collections, have been prepared for the Institution:

1. Check-list of Minerals, by Thomas Egleston.

2. Instructions relative to Ethnology and Philology, by George Gibbs.

3. Comparative Vocabulary, by George Gibbs.

4. Dictionary of the Chinook Jargon or Trade Language of Oregon, by George Gibbs.

5. Monograph of the Bats of North America, by Dr. H. Allen, United States army.

No. 1 of these works has been prepared to aid in arranging and cataloguing the Smithsonian collection of minerals and the distribution of duplicate specimens, but it will also be of value in facilitating the study of mineralogy by furnishing printed labels and check-lists for exchanges. It presents a list of all the described species of minerals, with their chemical symbols and systems of crystallization, indicating those which are peculiar to the United States, the whole arranged according to the method adopted by Professor Dana in the last edition of his Manual of Mineralogy. For important additions and corrections, this work is indebted to the principal mineralogists of this country, to whom the proofs were submitted, and especially to Professor Dana, Professor Brush, and Dr. Genth. This list is completed, and will shortly be ready for distribution.

No. 2 of these works was printed in the Smithsonian annual report for 1861, but a large demand having arisen for it, it has been reprinted with corrections and additions, and now includes instructions for philological observation, rules for recording sounds and vocabularies, &c. In the latter part of the work Mr. Gibbs has received important assistance from Professor W. D. Whitney, of Yale College.

It includes directions for the collection of various specimens, hints for special inquiry, &c. Among the former are the skulls of American Indians, which in some cases are difficult to obtain, on account of the jealousy with which the natives guard the remains of their dead. Numerous tribes, however, have become extinct, or have removed from their former abodes. The remains of victims of war are often left where they fall, and the bones of slaves and of the friendless are neglected. Relics of these can be obtained without offence to the living. It is, however, of essential importance that most positive information should be obtained as to the nation or tribe to which a particular skull belongs. This may frequently be learned from the history of the migrations of the tribe, or from the character of the ornaments and utensils found with it.

Among the specimens of art which are designated as desirable are dresses, ornaments, bows and arrows, lances, saddles with their furniture, models of lodges, cradles, mats, baskets, gambling implements, models of canoes, paddles, fish-hooks, carvings in wood and stone, tools, &c.

American antiquities are especially indicated as objects of interest. They include the tools found in the northern copper mines, articles

inclosed in mounds, images, pottery, also the contents of ancient shell beds found on the sea-coast and bays, often deeply covered with earth and overgrown with trees; human remains, or implements of human manufacture, bearing the marks of tools or of subjection to fire, found in caves, beneath deposits of stony material formed by droppings from the roof; similar articles in salt-licks, likewise in deposits of sand and gravel, or such as evidently belonging to the drift period. Among other desiderata mentioned are the names of tribes, geographical position, number of individuals, physical constitution, such as stature, proportion of limbs, facial angle, color of skin, hair, and eyes; inscriptions, dress, food, dwellings, arts, trades, religion, government, social life, ceremonies, mode of warfare, medicine, literature, method of dividing time, history, &c.

These directions also include a list of words most important to be used in forming the vocabulary of a language. The pamphlet consists of thirty-four pages, and is distributed gratuitously to all who are desirous of aiding investigations of this character.

No. 3 is a vocabulary of the principal words of which the equivalents are desired in the languages of the American Indians. It has been prepared with great care by Mr. Gibbs after the usual models, presenting in parallel columns the words selected in English, French, Spanish, and Latin, leaving a blank column to be filled by the required equivalents in the dialect of any given tribe. It forms a pamphlet of eighteen pages, including two hundred and eleven different words, and is printed on letter paper, for convenience in filling up the blanks.

No. 4, the Chinook Jargon, is a collection of phrases made up from various languages, Indian and civilized, and constitutes the sole medium of communication with the Indian tribes of the northwest. In 1853 the Smithsonian Institution published a brief dictionary of this language, from a French manuscript presented by Dr. B. R. Mitchell and edited by Professor W. W. Turner. The article was in great demand, and the edition was soon exhausted. Mr. Gibbs, having paid particular attention to the Jargon during his long residence in Washington Territory, kindly offered to prepare a new edition with corrections and additions. This offer was readily accepted, and the dictionary has been published during the past year.

The vocabulary of the Chinook contains words of two dialects, the Chinook proper and the Clatsop, and perhaps also of the Wakiakum. The nation or rather family to which the generic name Chinook has been applied, formerly inhabited both banks of the Columbia river

from its mouth to the Grand Dalles, a distance of about one hundred and seventy miles, and was, as is usual among the sedentary Indians of the west, broken up into numerous bands. Mr. Hale, in his Ethnography of the United States Exploring Expedition, has divided these into the Upper and Lower Chinook. The present vocabulary belongs to those nearest the mouth of the river, of which there were five principal bands. The language of the bands further up the river departs more and more widely from the Chinook proper; indeed, so much so that the lower Indians could not have understood the upper ones without an interpreter. This vocabulary is not as full as could be wished, and the only reason for publishing it in its present condition is that the Indians speaking the language are so nearly extinct that no better digest is likely to be made in future.

In regard to the 5th article of the above series, the Monograph of Bats of North America, it may be stated that the mammalia of this continent have been studied and described generally by Audubon, Bachman, and also by Professor Baird of this Institution. These authors, however, have not included in their descriptions the cheiroptera, or bats. To supply this deficiency, Dr. Allen, of Philadelphia, has given his attention for several years to the careful study of the specimens of this animal in the principal museums of this country, and has presented the result of his labors to the Institution in the form of the monograph above mentioned. In this a detailed description is given of each of the genera and species with wood-cut figures of the skulls, heads, ears, and tails of such species as require this mode of illustration. The wood-cuts of this paper have been completed and the manuscript is now in the hands of the printer.

I may mention that the Institution is indebted to Mr. Figaniere, Portugese minister, for a very graphic account of an immense assemblage of bats which had been colonized for years in the upper part of a mansion house which he had purchased in Maryland. This account will be republished in the appendix to this report, as well as in the paper of Dr. Allen just described.

Reports.—The annual reports to Congress are printed at the expense of the government as public documents, with the exception of the wood-cuts, the cost of which is paid by the Institution. Previous to 1853 the reports were principally confined to an exposition of the operations of the Institution, and were published in pamphlet form; but since that date an appendix has been added to each report, which, with the other matter, has increased the size to that of a volume of four hundred and fifty pages. These reports now form a series of ten

volumes, beginning with that of 1853, and in order that this series might contain a history of the Institution from the beginning, the will of Smithson, the enactments of Congress in regard to it, and the several reports of the Secretary, previous to 1853, were republished in the appendix to that volume.

The report for 1862 contains, in the appendix, a eulogy on the late Senator Pearce, by Professor Bache; a course of lectures on Polarized Light, by F. A. P. Barnard, late president of the University of Mississippi; a course of lectures on Ethnology, by Professor Daniel Wilson, of the University of Toronto; an introduction to a course of lectures on the Study of High Antiquity, by A. Morlot, of Switzerland, translated for the Institution by the author; an account of the Articles on Archælogy, published by the Smithsonian Institution, copied from the "Natural History Review," of England; a history of the French Academy of Sciences; eulogies on Von Buch and Thenard, a continuation of the series of memoirs of distinguished members of the French Academy, translated by C. A. Alexander, esq.; a Memoir of Isidore St. Hilaire, by Quatrefages, translated by a lady; a prize Memoir on the Catalytic Force, by T. L. Phipson; on Atoms, by Sir John Herschel; Classification of Books, by J. P. Lesley; Account of Human Remains from Patagonia, and Prize Questions of Scientific Societies.

Of this report the usual number of 10,000 copies was printed, of which 4,000 copies were given to the Institution, to be distributed in accordance with the following rules:

1. To all the meteorological observers who send records of the weather to the Institution.
2. To the collaborators of the Institution.
3. To donors to the museum and library.
4. To colleges and other educational establishments.
5. To public libraries, and literary and scientific societies.
6. To teachers, or individuals who are engaged in special studies, and who make direct application for them.

Owing to the many changes which have taken place in the residence and occupation of the correspondents of the Institution since the commencement of the war, it has not been thought advisable to send the reports to all whose names are on the record of distribution, but in most cases to wait until direct application is made by letter or otherwise for a copy of the work. Whenever a report is sent to any address a separate announcement is made of the fact enclosing a blank receipt to be signed and returned to the Institution.

On account of the large amount of printing required by the government in consequence of the war, the public printing office has been taxed to its utmost power ; documents not required for immediate use have been delayed, and among others the report of the Institution for 1862 is still not quite completed. It is expected, however, that it will be ready for distribution in the course of a few weeks. The number of copies of the report ordered to be printed by Congress has varied in different years, and consequently in the increasing demand some of the volumes have been entirely exhausted. It may be a matter of consideration whether a new edition of the report for 1856, and perhaps for other years, might not be reprinted. To prevent the future exhaustion of the supply of the reports, Congress authorized the stereotyping of the last volume and the printing at any time, from the plates, of the whole or any part of its contents.

In view of the great cost of paper and the space required for storage, it has been thought advisable to stereotype the Contributions and Miscellaneous Collections, and to strike off only as many copies of each article as are required for immediate distribution. By the adoption of this plan, the ability to supply, to any extent, copies of works published hereafter will always exist, while no more need be printed than are actually required.

Ethnology.—From the first, the Institution has given considerable attention to the various branches of ethnology. Besides the additions to Indian archæology which are to be found in the several volumes of its Contributions to Knowledge, it has published several papers on languages. In the report for 1860, a list of original manuscripts was given relating to the languages of the northwest coast of America, which had been received through the assistance of Mr. Alexander S. Taylor, of Monterey, California.

Several of these were copied at the expense of the Institution, with the intention of securing their preservation and subsequent publication. It has also been stated that a number of these manuscripts had been presented to Mr. J. G. Shea, of New York, to be published in a series which he has established under the title of "Library of American Linguistics." By presenting these to Mr. Shea for publication and purchasing from him for distribution to learned societies a number of copies, encouragement has been given to a laudable enterprize, undertaken solely to promote a favorite branch of learning, and with but little comparative expense to the Smithsonian fund. I regret, however, to state that the diminution of the effective income of the Institution will prevent further appropriations at present for this purpose. The following is a list of the works of Mr. Shea's

series, of which the Institution has aided the publication by purchasing copies for distribution:

1. Grammar of the Mutsun language, spoken at the mission of San Juan Bautista, Alta California; by Father Felipe Arroyo de la Cuesta.

2. Vocabulary of the language of San Antonio mission, California, by Father Bonaventure Sitjar.

3. Grammar and dictionary of the Yakama language, by Rev. Mie. Cles. Pandosy.

4. Vocabulary or Phrase Book of the Mutsun language, of Alta California, by Rev. Father Felipe Arroyo de la Cuesta.

5. Grammar of the Pima or Névome, a language of Sonora, from a manuscript of the XVIII century.

The first of these, the Mutsun grammar, was described in the last report. The second, the vocabulary of the native inhabitants of the San Antonio, or Sextapay, mission; it was printed from a manuscript forwarded to the Institution by Alexander S. Taylor, of California. The mission of San Antonio de Padua was founded in 1771, in the Sierra of Santa Lucia, twenty-five leagues southwest of Monterey; the authors of this vocabulary being the first missionaries. The tribe is sometimes known as *Tatché*, or *Telamé*, though Mr. Taylor calls it *Sextapay*. It is gradually disappearing; not more than fifty Indians still remain, although it is said they were, at one time, so numerous that the dialects spoken by them amounted to twenty.

The third is the grammar and dictionary of the Yakamas, a people inhabiting the region of the Yakama river—a stream rising in the Cascade range of mountains, and emptying into the Columbia above the junction of the Snake river. The name signifies the "stony ground," in allusion to the rocky character of the country. The author of the grammar, Father Pandosy, was for many years a resident among these Indians, and became well acquainted with their language. In the destruction of the buildings of the mission by fire, during the Indian war in Washington Territory, the original of the grammar was lost, and the translation, published by Mr. Shea, which was made some time previously, alone remained. It is to be regretted that a more extended dictionary than the one now published was also destroyed at the same time.

The fourth article is a vocabulary of the same language, of which the grammar constitutes the first of this series, and is by the same author; the words are given in the Mutsun and Spanish languages.

The fifth, the grammar of the Pima, with a vocabulary in the same language and in Spanish, was obtained in Toledo, Spain, and trans-

lated by Buckingham Smith, esq. This manuscript was probably taken to Spain after the suppression of the order of the Jesuits in Mexico, in 1767. The Pima language was spoken by the tribes from the river Yaqui, in Sonora, northward to the Gila, and even beyond the Colorado, eastward beyond the mountains in the province of Taraumara, and westward to the sea of Cortez. The phrases given in these works will preserve the knowledge of what constituted the food of the inhabitants ; their manner of living, their character, and native customs, &c. This may prove of historic interest hereafter, if the facts be nowhere else more circumstantially authenticated.

Meteorology.—From 1856 to 1861 an appropriation was made from the agricultural fund of the Patent Office for assistance to the Institution in collecting and reducing statistics relative to the climate of the United States. This was commenced while the Patent Office was under the direction of Judge Mason, but was suddenly discontinued under a change of administration. The propriety of an appropriation for this purpose, from the fund above mentioned, must be evident to every one who reflects on the intimate connexion between meteorology and agriculture. A knowledge of the peculiarities of the climate of a country is an essential requisite for the adoption of a system of scientific culture. The average temperature of the spring, autumn, and of the growing season ; the ratio of the number of unfavorable to favorable years ; the amount of rain, and moisture ; the average time of the occurrence of late and early frosts, are all facts of importance in the economical adaptation of the crops to a given locality, in order to obtain the maximum of produce from a definite amount of labor.

The money received from the Patent Office was expended in assisting to defray the expense of the reductions of the observations, and as soon as the appropriation was stopped we were obliged to discontinue this part of the operations. The Institution, however, still continues to derive some benefit from its association with the Patent Office, in receiving through it, free of postage, the returned registers from the different observers.

Unfortunately, the postage law adopted at the last session of Congress prevents the correspondents on agriculture and meteorology from sending their reports by mail unless prepaid. This arrangement almost entirely stops the reception of these articles, for, since the service rendered is gratuitous, the observers cannot be expected to bear this additional burden. It is to be hoped that Congress will so modify the law as to remove this obstruction to a correspondence of great importance to the agricultural interests of the country.

Owing to this restriction, the number of meteorological registers received during the past year has been diminished, and the transmission of nearly all of them would have been discontinued had not the Commissioner of Agriculture, in view of their value to his department, decided to advance to some of the observers the necessary postage stamps to affix to their registers. He would willingly have sent stamps to all, but the tax would have been too heavy for the office; he therefore found it necessary to limit the number, and in doing so endeavored to make such a selection as would secure registers from districts distributed as uniformly as possible in all the States. Those observers, therefore, who have not been supplied with stamps should infer from this no disparagement of their observations, for among those who have been omitted from the list are some whose registers are highly prized for their regularity and accuracy.

Before it was known that this arrangement would be made by the Commissioner a circular was sent from this Institution to all the observers, mentioning the new feature in the postage law, and requesting them to continue their observations, and retain the records until the law should be modified, or some arrangement could be made by which the observers would not be subject to the burden of postage.*

Under the new organization of the Department of Agriculture a renewed interest has been manifested by the Commissioner in the collection of meteorological statistics, and he has expressed the desire to co-operate with this Institution in continuing and extending the system of records of the weather which it had established with so much labor and expense.

In order to obtain and diffuse a knowledge of facts of immediate importance to agriculturists, the Commissioner has commenced the publication of a monthly bulletin giving the state of the crops, the condition of the weather, and various other items of importance which are daily received from observers, and which would lose a considerable portion of their value were they suffered to remain unpublished until the end of the year. For this bulletin the Institution supplies the meteorological materials, consisting of the mean, maximum, and minimum temperature and amount of rain for each month in different States, and also, for the purpose of comparison, the mean temperature and amount of rain for a series of five years, grouped by States;

* This law has been changed since the above was written, and observers can send their meteorological registers, or other communications, to the "Commissioner of Agriculture," *without prepayment of postage.*

together with tables of important atmospheric changes, and notices of auroras, meteors, and other periodical phenomena. The publication has been received with much favor by agriculturists, and is regarded with great interest by the observers, who are thus furnished promptly with a general summary of the principal features of the meteorology of each month in all parts of the country, with which they can compare their own observations.

In view of the value of the information thus furnished by the Institution, it is hoped that the previous appropriation will be renewed, and that the reductions which have been discontinued for the last four years may be resumed.

The second volume of the Results of Meteorological Observations made for the Institution, from 1854 to 1859, and reduced by Professor Coffin, is still in the press, its completion being delayed by the great pressure, upon the public printing office, of government work relative to the war.

We are indebted to the courtesy of Captain (now General) George G. Meade, of the topographical engineers, superintendent of the survey of the north and northwestern lakes, and of his successor in office, Lieutenant Colonel J. D. Graham, for a continuation of the favor formerly extended to the Institution in furnishing us with copies of the meteorological observations made at the different stations established for the survey. These records are very valuable, being made with full sets of instruments and at important places. They embrace observations made three times a day, at the same hours with the Smithsonian system, 7 a. m. and 2 and 9 p. m., and at ten stations, extending from Superior City in the State of Wisconsin, at the western extremity of Lake Superior, to Sackett's Harbor in New York, on the east end of Lake Ontario.

The Bureau of Medicine and Surgery of the Navy Department also continues to furnish us with the meteorological records kept at the naval hospitals at Chelsea, New York, and Philadelphia.

For several years previous to the commencement of the war a large map was exhibited in the Smithsonian Institution on which was daily represented the direction of the wind and face of the sky over the greater portion of the United States; and in previous reports we have frequently called attention to the fact that a properly organized system for giving daily or half daily changes of the weather in distant parts of the United States would be of great practical importance to the shipping interests of the country; we have also stated the fact that we are much more favorably situated for predicting the coming

weather than the meteorologists of Europe. The storms in our latitude generally move from west to east, and, since our seaboard is on the eastern side of a great continent, we can have information of the approaching storm while it is still hundreds of miles to the west of us. Not so with the meteorologists of Europe, since they reside on the western side of a continent, and can have no telegraphic dispatches from the ocean. The proposition, however, to furnish constant information of this kind could not be carried out by the limited means of the Smithsonian Institution, and, indeed, can only be rendered properly and fully serviceable under the direction and at the expense of the government.

New and interesting features have been introduced into the daily meteorological bulletin published by the Imperial Observatory at Paris. As mentioned in the last report, these bulletins are lithographed each day from records of the barometer, thermometer, wind, and face of the sky, compiled from telegraphic reports transmitted to the observatory from various parts of Europe. In addition to these, they now contain daily a small outline chart of Europe upon which are drawn diagrams showing the barometric curve of the day through the various stations, together with the temperature and direction and force of the wind. For the use of vessels about to leave port, a statement is also given of what will probably be the direction of the wind the next day. Chambers of commerce and intelligent seamen have acknowledged in strong language the benefit of these daily bulletins, thus adding to the ever-accumulating testimony in favor not only of the speculative interest but also practical benefits of meteorology. At Bordeaux, Havre, and other important ports, as soon as the bulletins are received, the telegraphic announcement of the weather and the probable direction of wind for the following day are posted in public places and furnished to the principal newspapers for publication. The bulletin also contains extracts from the correspondents of the observatory on astronomical and other subjects as well as meteorology. With the number for December 20, a supplement was issued with a diagram exhibiting the indications of the self-registering instruments at the Royal Observatory, Greenwich, during the great storm on the English coast in the first three days of December, 1863.

Laboratory.—The principal work which has been done in the laboratory during the past year is an extended series of experiments on the properties of different kinds of oil intended for light-house purposes. For a number of years past the price of sperm oil has been constantly increasing, and from a dollar per gallon it had ad-

vanced last year to two dollars and forty-three cents. It became, therefore, an important matter to the Light-house Board to determine whether some other burning material could not be introduced in the place of so expensive an article. The investigation of this subject was given in charge to myself, as the chairman of the Committee on Experiments. The result of the investigations not only revealed a number of new phenomena of interest to science, but also established the important practical fact of the superiority of winter strained lard oil over standard sperm oil in the intensity of the light, the steadiness and persistence of the flame, and the less care required in attendance. This fact must have an important bearing on the cost of lighting the extended coast of the United States, as well as upon the commercial value of one of the staple products of the western part of our Union. The price of lard oil is, at present, considerably less than one-half of that of sperm, and while the supply of sperm oil has remained stationary, or even diminished with an increasing demand, the sources of lard oil in the country are abundant, and the quantity which can be produced will be sufficient to meet almost an unlimited consumption.

Another series of experiments was made for determining the proper arrangements of reflectors and lenses for illuminating distant objects either by the electric or the calcium light. These experiments were instituted at the suggestion of the Navy Department, but as no appropriation was made for their being carried into practice, they were discontinued, and the knowledge obtained remains unapplied.

Collections of specimens of natural history, &c.—In several of the preceding reports a distinction has been drawn between the collection of specimens of natural history made through the agency of this Institution, and what is called the Smithsonian museum. The object of making large collections of duplicate specimens is, first, to advance science by furnishing to original investigators new materials for critical study; and second, to assist in diffusing knowledge, by providing colleges, academies, and other educational establishments, with labelled specimens to illustrate the various productions of nature, while the principal end to be attained by the public museum of the Institution is the gratification and instruction of the inhabitants and visitors of the city of Washington.

The collecting and distributing of a large number of specimens, for the purpose stated, is an important means of increasing and diffusing knowledge, and, as such, is in strict accordance with the will of the founder of the Institution. It has, therefore, from the first received

much attention, and has been attended with a commensurate amount of beneficial results. Among the collections received during the past year have been specimens of great interest, either the results of explorations, undertaken by the Institution, or of exchanges with individuals or local societies. The materials thus collected belong principally to two classes, namely, to specimens of new or rare forms intended to advance natural history and duplicates of such as are to be labelled and distributed for the purposes of education. Among the former are the collections of Mr. Kennicott, whose explorations have been mentioned in previous reports. They are of a very valuable character, illustrating the natural history and ethnology of the northwestern portions of the continent of North America. The specimens received in 1863, from this exploration, filled forty boxes and packages, weighing, in the aggregate, 3,000 pounds. They embrace in the line of natural history thousands of skins of mammals and birds, eggs, nests, skeletons, fishes, insects, fossils, plants, &c. In the line of ethnology are skulls, dresses, weapons, implements, utensils, instruments of the chase, in short, all the requisite material to illustrate the peculiarities of the Esquimaux and different tribes of Indians inhabiting the northwest regions.

In addition to the collections obtained from the British possessions in North America, by Mr. Kennicott, specimens have been received from other points and other parties. Among these are a series of birds and eggs from Labrador, gathered by Mr. Henry Connolly, and a large amount of new material from Mexico, collected by John Xantus, under the auspices and at the expense of the Institution, consisting of birds, fishes, reptiles, shells, &c. Another series from the same country has been presented by Dr. Sartorius, who has, for a number of years, been one of the meteorological observers of the Institution. Interesting collections have been received, also, from Dr. A. Van Frantzius, of Costa Rica; from Mr. Osbert Salvin, of Guatemala; from Captain J. M. Dow, of Panama; specimens from Cuba have been presented by Mr. C. Wright and Prof. Poey; from Trinidad, by Mr. Galody, United States consul; from Jamaica, by Mr. W. T. March; from Ecuador, by the Hon. C. T. Buckalew, now of the United States Senate. A valuable contribution of birds and mammals has also been received from Prof. Sumichrast, of Orizaba. These collections are all intended to illustrate the natural history of the American continents, to the investigation of whose extended regions the Institution has especially directed its labors.

In order to facilitate the preparation of a work on the birds of America, by Prof. Baird, a circular from the Institution was dis-

tributed through the State Department to the consular and diplomatic agents of the United States in Central and South America, asking aid in completing the collection of birds, and we doubt not that much new and valuable material will thus be obtained.

The following are the rules which have been adopted in regard to the disposition and use of the collections:

First. To advance original science, the duplicate type specimens are distributed as widely as possible to scientific institutions in this and other countries, to be used in identifying the species and genera which have been described.

Second. For the purposes of education, duplicate sets of specimens, properly labelled, are presented to colleges and other institutions of learning in this country.

Third. These donations are made on condition that due credit is to be given the Institution in the labelling of the specimens, and in all accounts which may be published of them.

Fourth. Specimens are presented to foreign institutions, on condition that if type specimens are wanted for comparison or other use in this country they will be furnished when required.

Fifth. In return for specimens which may be presented to colleges and other institutions, collections from localities in their vicinity shall be furnished when wanted.

In the disposition of the undescribed specimens of the collection, the following considerations have been observed as governing principles:

First. The original specimens are not to be intrusted for description to inexperienced persons, but to those only who have given evidence of ability properly to perform the work.

Second. Preference is to be given to those who have been engaged in the laborious and difficult enterprise of making complete monographs.

Third. The investigator may be allowed, in certain cases, to take the specimens to his place of residence, and to retain them for study a reasonable time.

Fourth. The use of the specimens is only to be allowed on condition that a series of types for the Smithsonian museum will be selected and properly labelled, and the whole returned in good condition.

Fifth. In any publications which may be made of results derived from an investigation of the materials from the Smithsonian collection, full credit must be accorded to the Institution for the facilities which have been afforded.

During the past year the assorting and labelling of the specimens have been continued, as well as the distribution of duplicates.

The whole number of entries on the record book of the Smithsonian collection, at the end of the year 1861, was 66,075; at the end of 1862, 74,764, and at the end of 1863, 86,847; but each entry indicates a lot consisting of a number of specimens. The whole number of duplicate specimens distributed to different institutions in this country and abroad, up to the end of the year 1863, has been 94,713. As these specimens are distributed on the express condition that full credit is to be given to the Institution on the labels, and in all publications which may relate to them, the name of Smithson, even through this distribution alone, would become familiarly known in every part of the civilized world.

It has been, from the first, one of the prominent objects of the Institution to collect the most ample materials for illustrating the entire natural history of North America; to determine the different species of plants and of animals; to ascertain the distribution of the former, and the migrations of the latter. This object it has endeavored to accomplish through the agency of the different surveying expeditions of government; through explorations instituted at its own expense, and by enlisting the co-operation of individuals interested in science, and of local scientific societies. In all its efforts in this line it has been heartily supported, and it is believed that its labors have been productive of valuable results. The collections thus made have been intrusted to competent investigators for examination and description, and the results published in the different Smithsonian series, in transactions of societies, and in various government reports. For a list of what has already been prepared and published, either by the Institution or under its direction, I would refer to a report on this subject in preparation by Professor Baird.

Museum.—The additions to the museum, in the line of natural history, are principally confined to the type specimens which have been collected and described at the expense of the general government, or under the immediate auspices of the Institution. Even thus restricted, the specimens increase in number more rapidly than the portion of the Smithsonian fund which can be devoted to their support will authorize. Few persons have an idea of the labor, constant care, and expense which attends the proper preservation of a series of objects of natural history; but those who have had the necessary experience know that large miscellaneous collections can only be properly supported by governments, and, in the establishment of provincial socie-

ties, the rule has been strongly recommended of attempting to preserve nothing except what is strictly local. "It is the experience of societies," says Dr. Jardine,* the celebrated Scotch naturalist, "that general collections are encumbrances, and in most instances get destroyed for want of care, or they are dispersed. Within these few years the really fine and valuable collection of the Zoological Society of London, chiefly presented by the late N. A. Vigors, a first-rate scholar and naturalist, and containing many unique things from our scientific exploratory voyages, has been sold. That of the Entomological Society has also been sold, and the greater part of that belonging to the Linnæan Society was sold during the last month, because there was not sufficient space to keep what had been presented to them. The collection of the Royal Society of Edinburgh is now undergoing the same process."

During the past year the work of labelling the specimens in the museum, so that the common, as well as the scientific name of each article may be distinctly exhibited, has been continued.

Explorations.—The only explorations during the past year, under the auspices and at the expense of the Institution, are, 1st, the continuation of that of Mr. Xantus on the western coast of Mexico; and, 2d, that by Mr. Meek in New Jersey and the lower part of Virginia. The explorations of Mr. Xantus extended several hundred miles along the western coast of Mexico in a region little known, and very abundant in interesting objects.

The exploration of Mr. Meek related to the collection of complete series of shells to illustrate the tertiary formation of the seaboard of New Jersey and Virginia. Several series of shells were obtained, which are in the process of being accurately labelled, and are intended for distribution to some of the principal colleges of the country.

Exchanges.—The important aid rendered to science and literature by the system of international exchange which has for many years been actively carried on by the Institution, is still everywhere highly appreciated. Our operations in this line are becoming more and more extensive, requiring an additional amount of time, labor, and attention, as well as largely increasing in expense. The great liberality of many of the transportation companies alone enables us to carry on the system in its present extent, and we again tender our acknowledgments, especially to the following parties, who have

* Address of Sir W. Jardine, president of the Dumfriesshire and Galloway Natural History and Antiquarian Society, December, 1863.

assisted us in this respect: The North German Lloyd, between Bremen and New York; the Hamburg and New York steamship line; the Cunard line; the Panama Railroad Company; the Pacific Mail Steamship Company; Adams's Express Company, and the Hudson's Bay Company.

During the past year it was deemed advisable to establish a new agency of exchanges for Holland and Belgium, and Mr. Fred. Muller, bookseller, at Amsterdam, who was appointed the agent, has entered upon the discharge of his duties with zeal and efficiency. The numbers of the transactions of the societies in the countries referred to necessary to complete the sets in the Smithsonian library, as well as much other valuable scientific and literary material, have been procured by him. The other foreign agents of the Institution are still Dr. Felix Flugel, Leipsic, Mr. Wesley, London, and Gustave Bossange, Paris.

From the tabular statement given by Professor Baird, it appears that during the year 1863 there have been sent to foreign countries 1,426 packages, each containing a number of articles, enclosed in 61 boxes, measuring 447 cubic feet, and weighing 10,286 pounds. The number of packages received in return for societies and individuals in this country was 1,522, included in which, for the Smithsonian Institution, were 4,589 books and pamphlets, besides specimens of natural history.

Library.—The policy in regard to the library as has frequently been previously stated, is to form a collection as perfect as possible of all the tranactions and proceedings of the learned societies of the world. The success of the Institution in this enterprise has been fully commensurate with the expectations entertained, and the collection of works of this class, if the accumulation continues under the same favorable conditions, will soon rival any other of a like kind in the world. The liberal distribution which the Institution has made of its own publications and those of government has produced a rich return in series of transactions which, although existing as duplicates in some of the older libraries of Europe, can scarcely be obtained by purchase.

It was mentioned in the last report that the number of transactions and proceedings of learned societies contained in the library of the Institution had increased so much that a new edition of the catalogue previously published had become necessary. This work has since been put to press, and will be printed as rapidly as the care necessary to insure acccuracy will permit. Copies of this catalogue

will be distributed to all the principal libraries of the country, and with the liberal policy which has been adopted in regard to the books of the Smithsonian collection, will serve to render the library more generally useful.

By exchanges there have been received 719 octavos, 167 quartos, and 24 folios; of parts of volumes and pamphlets, in octavo, 2,119; in quarto, 779; in folio, 581; maps and charts 200; total, 4,589. In addition to these about 400 volumes were purchased.

Among the valuable works received during the year, are the following:

55 volumes from the Royal Library of Stockholm.

Comptes-Rendus, 1859, 1860, 1861, with atlas, from the Commission Imperiale Archælogique, St. Petersburg.

12 volumes and 18 parts of volumes from the Koninlijk Institut des Ingenieurs, d'Gravenhage.

52 volumes and 94 pamphlets from the Nederlandsch Maatschappig ter Bevordering van Nijverheid, Haarlem.

10 volumes of its own publications from the Société pour la recherche et la conservation des Monuments Historiques du Grand Duché de Luxembourg, Luxembourg.

24 volumes and 12 parts from the Kaiserliche Akademie der Wissenschaften, Vienna.

9 volumes and 29 charts from the Etablissement Géographique de Bruxelles.

21 volumes of Proceedings from the Société d'Agriculture, Commerce, Science et Arts du Dept. de la Marne.

24 volumes of Proceedings and Transactions from the Institution of Civil Engineers, London.

36 volumes and 114 charts from the Board of Admiralty, London.

Large donations from the Royal University of Norway.

Braddam's Memoirs of the Royal Society of London, vol. I—X, 1745, from Mrs. Mary A. Malthie, Syracuse, New York.

26 volumes from the Regents of the University in behalf of the State of New York.

Lectures.—The usual course of lectures has been commenced for the present season, and will embrace the following:

Five lectures, by Rev. John Lord, of New York, on the "Fall of the Roman Empire." *Subjects.*—I. The grandeur and glory of the Ancient Civilization—The external splendor of the Roman Empire in its latter days. II. The internal hollowness and defects

of the old Roman civilization—The shame and miseries of society—The vices of self-interest, and preparation for violence and inevitable ruin. III. The fall of the empire, and the desolations produced by the barbarians—The destruction of the old fabric of society. IV. The reasons why the old conservative influences of paganism did not arrest the ruin—The failure of art, literature, and science, and the mechanism of governments. V. The reasons why Christianity did not save the Empire, and the ideas which the church incorporated with subsequent civilizations—The foundation of the new Teutonic structure.

Three lectures, by Professor Louis Agassiz, of Cambridge, Massachusetts, on the "Glacial period."

One lecture, by Professor J. L. Campbell, of Wabash College, on "Galileo."

Seven lectures, by Dr. Reinhold Solger, on "The Races of Men."

Six lectures, by Professor W. D. Whitney, of Yale College, on "Philology." I. History and objects of linguistic science—Plan of these lectures—Why and how do we speak English—How language is preserved and perpetuated—Its constant change—The study of language an historical science. II. Illustration of the processes of growth and change in language—Formation of words by combination of old materials—Mutilation and corruption of existing forms—Change and development of meaning—Rate of progress of these changes. III. Statement and illustration of the influences causing the growth of dialects, and those checking and counteracting this growth—Our language a Germanic dialect, with partly French vocabulary—Other languages with which it is related—Branches of the Indo-European family of languages, and proof that they are of common descent—Place, period, and grade of civilization of the original tribe. IV. Historical and linguistic importance of the Indo-European race and language—History of the language—Its development from monosyllabic roots. V. Survey of the other great families of language, Semitic, Scythian, Chinese, Polynesian, Egyptian, African, and American—Isolated languages not included in these families. VI. Comparative value of linguistic and physical evidence of race, and their relative bearing on the science of ethnology—Relation of the study of language to the question of the unity of the human race—origin of language—Its character and value to the human race.*

The number of applications for the use of the lecture-room has

* A synopsis of this course of lectures has been furnished by the author for insertion in the appendix to this report.

been much less since the adoption of the rule restricting its use to the purposes of the Institution exclusively has become more generally known. This rule, which has been widely approved of by the enlightened public, has precluded a large amount of unprofitable correspondence and enabled the Institution to avoid an embarrassing and inauspicious connexion with sensational expositions of the exciting subjects of the day.

From the preceding account of the present condition of the Institution, and of its operations during the past year, as well as from the examination of the collections and publications, it is hoped that, notwithstanding the unfavorable condition of the country for scientific research, and the diminished means at our command, it will appear that the line of policy and of action originally adopted has been pursued with unabated ardor and with corresponding success.

Respectfully submitted.

JOSEPH HENRY, *Secretary.*

WASHINGTON, 1864.

APPENDIX TO THE REPORT OF THE SECRETARY.

SMITHSONIAN INSTITUTION,
Washington, December 31, 1863.

SIR: I have the honor to present herewith a report, for 1863, of the operations intrusted to my charge, consisting especially of those relating to the printing, the exchanges, and the collections of natural history.

Very respectfully, your obedient servant,

SPENCER F. BAIRD,
Assistant Secretary Smithsonian Institution.

Prof. JOSEPH HENRY, LL.D.,
Secretary Smithsonian Institution.

PRINTING.

An accompanying table will show the works printed during the year, and also those now in press. The total number of pages belonging to works finished within the year is:

Of quarto papers	350 pages, 3 plates.
Octavo Miscellaneous Collections	1,313 pages.

Of works still in press there have been printed:

Of quarto works, about	108 pages.
Octavo	443 pages.

Making a total of 458 quarto pages, and 1,756 octavo, exclusive of the annual report to Congress, nearly finished, and to fill 450 pages.

EXCHANGES AND TRANSPORTATION.

The system of exchanges has been in a highly successful condition during 1863, both the receipts and transmissions being fully equal to the average of any previous year. The attendant expenses of this branch of operations are, however, great and increasing, and would long since have become almost prohibitory but for the liberality exhibited by various transportation companies in carrying the boxes and parcels of the Institution free of any charges for freight. It is not too much to say that thousands of dollars are thus presented by the companies as a recognition on their part of the great importance, domestic as well as international, of these operations of the Institution. Among the parties deserving of especial mention in this connexion are the proprietors of the Cunard steamers between New York and Liverpool, and New York and Havana; the North German Lloyd, between New York and Bremen; the Hamburg American Packet Company, between New York and Hamburg; the Panama Railroad Company; the Pacific Mail Steamship Company; the Hudson's Bay Company; the Adams Express Company, &c.

The Institution is under especial obligations, for important services rendered in this connexion, to the Hon. Hiram Barney, collector of the port of New York, and to his assistant, Mr. George Hillier; to Mr. A. B. Forbes and Mr. Hubbard, of the Pacific Mail Steamship Company, in San Francisco, as well as to the regular agents of the Institution.

During the year, 1863, a new literary agency of the Institution was established for Holland and Belgium. Mr. Frederick Müller, bookseller, of Amsterdam, was placed in charge, and he has already rendered much service. The other foreign agents of the Institution—Dr. Felix Flügel, of Leipsic; Gustave Bossange & Company, of Paris; and Mr. William Wesley, of London—continue to discharge their duties with efficiency, and to the full satisfaction of the Institution.

The number of institutions and individuals, at home and abroad, making use of the facilities of scientific exchanges offered by the Smithsonian Institution is continually on the increase, and it is believed that any interruption or suspension of this part of the programme of operations would be considered as a serious calamity.

In 1862 the Institution distributed four volumes of Miscellaneous Collections, one volume of Annual Reports, and one thick quarto volume of Meteorological Records and Reductions. In 1863, owing to various circumstances, the Annual Report for 1861 was the only volume distributed, although many copies of separate papers were sent abroad. For this reason the bulk of sending, in 1863, was less than that of previous years, but it is expected that the difference will be fully made up in 1864.

The following tables exhibit the details of the operations in the line of exchange during 1863:

A.

Receipt of books, &c., by exchange in 1863.

Volumes:		
Octavo	719	
Quarto	167	
Folio	24	
		910
Parts of volumes and pamphlets:		
Octavo	2,119	
Quarto	779	
Folio	581	
		3,479
Maps and charts		200
Total		4,589
Receipts in 1861		2,886
Receipts in 1862		5,035

B.

Table showing the statistics of the exchanges of the Smithsonian Institution in 1863.

Agent and country.	Number of addresses.	Number of packages.	Number of boxes.	Bulk of boxes in cubic feet.	Weight of boxes in pounds.
DR. FELIX FLÜGEL, *Leipsic*—					
Scandinavia	1	1	.....	.....	.....
Sweden	13	31	.....	.....	.....
Norway	4	14	.....	.....	.....
Denmark	13	31	.....	.....	.....
Russia	42	76	.....	.....	.....
Germany	265	455	.....	.....	.....
Switzerland	30	58	.....	.....	.....
Belgium	10	24	.....	.....	.....
Total	378	690	26	202	3,500
FREDERICK MÜLLER, *Amsterdam*—					
Holland	40	81	.....	.....	.....
Total	40	81	4	31	1,006
GUSTAVE BOSSANGE & CO., *Paris*—					
France	107	180	.....	.....	.....
Italy	58	95	.....	.....	.....
Spain	7	16	.....	.....	.....
Portugal	4	8	.....	.....	.....
Total	176	299	13	88	2,800
W. WESLEY, *London*—					
Great Britain and Ireland	169	316	14	106	2,580
Rest of the world	20	40	4	20	400
Grand total	783	1,426	61	447	10,286

C.

Addressed packages received by the Smithsonian Institution from parties in America for foreign distribution in 1863.

Albany, N. Y.—	Number of packages.
Prof. James Hall	9
Boston, Mass.—	
American Academy of Arts and Sciences	116
Boston Society of Natural History	205
C. J. Sprague	1
Cambridge, Mass.—	
Harvard College	31
Museum of Comparative Zoology	342
Alexander Agassiz	34
Prof. Asa Gray	20
Jules Marcou	5

Cleveland, Ohio—	
Dr. J. S. Newberry	60
Columbus, Ohio—	
Ohio State Board of Agriculture	102
Detroit, Mich.—	
Lieut. Col. J. D. Graham, U. S. A	56
Janesville, Wis.—	
Institution for the Blind	73
Montreal, Can.—	
Prof. J. W. Dawson	7
New Haven, Conn.—	
American Journal of Science	18
American Oriental Society	8
Prof. J. D. Dana	15
New York, N. Y.—	
Mercantile Library	10
New York Lyceum of Natural History	101
Philadelphia, Pa.—	
Academy of Natural Sciences	165
Entomological Society of Philadelphia	9
Pharmaceutical Association	100
George W. Tryon	57
Santa Barbara, Cal.—	
A. S. Taylor	60
St. Louis, Mo.—	
St. Louis Academy of Sciences	172
Salem, Mass.—	
Prof. J. S. Russell	1
Toronto, Can.—	
Canadian Institute	6
Utica, N. Y.—	
State Lunatic Asylum	4
Washington, D. C.—	
United States Coast Survey	672
United States National Observatory	149
United States Patent Office	465
Superintendent of Census	200
J. E. Hilgard	15
Windsor, Nova Scotia—	
Prof. H. How	18
	3,316

D.

Addressed packages received by the Smithsonian Institution from Europe, for distribution in America, in 1863.

	No. of packages.
ALBANY, NEW YORK.	
Albany Institute	2
Albany Library	1
Dudley Observatory	6
New York State Agricultural Society	29
New York State Library	21
New York State Medical Society	1
New York State University	4
Dr. E. Emmons	1
Professor James Hall	4
AMHERST, MASSACHUSETTS.	
Amherst College	4
Dr. E. Hitchcock	2
Charles H. Hitchcock	1
Professor Charles Upham Shepherd	2
ANNAPOLIS, MARYLAND.	
State Library	4
ANN ARBOR, MICHIGAN.	
Observatory	2
Dr. Brunnow	4
AUGUSTA, MAINE.	
State Library	4
BALTIMORE, MARYLAND.	
Maryland Historical Society	2
Peabody Institute	1
Dr. J. J. Graves	1
Dr. John G. Morris	4
P. R. Uhler	2
BOSTON, MASSACHUSETTS.	
American Academy of Arts and Sciences	86
Boston Society of Natural History	65
Bowditch Library	1
Geological Survey of Massachusetts	3
Massachusetts Historical Society	3
New England Historico-Genealogical Society	1
North American Review	1
Perkins' Institute for the Blind	1
Prison Discipline Society	1
Public Library	4
State Library	4
Dr. S. L. Abbott	1
Dr. T. W. Harris	1
BOSTON, MASS.—Continued.	
Professor C. J. Jackson	1
Professor Rogers	1
S. H. Scudder	1
Charles Sprague	1
George Ticknor	1
BRATTLEBORO', VERMONT.	
Asylum for Insane	1
BRUNSWICK, MAINE.	
Historical Society of Maine	2
BURLINGTON, IOWA.	
Iowa Historical and Genealogical Institute	2
BURLINGTON, VERMONT.	
University of Vermont	1
CAMBRIDGE, MASSACHUSETTS.	
American Association for Advancement of Science	21
Astronomical Journal	2
Harvard College	11
Observatory of Harvard College	21
Professor L. Agassiz	40
G. P. Bond	4
Professor H. J. Clark	1
Professor J. P. Cooke	1
Dr. John Dean	1
Hon. Edward Everett	1
Dr. B. A. Gould	8
Professor Asa Gray	8
Professor H. W. Longfellow	1
Professor J. Lovering	1
Professor Jules Marcou	2
Professor B. Peirce	8
F. W. Putnam	1
Dr. T. H. Safford	2
Professor G. A. Schmit	1
Mr. Tuttle	1
CHICAGO, ILLINOIS.	
Academy of Sciences	6
Mechanics' Institute	1
CINCINNATI, OHIO.	
Astronomical Observatory	7
Dental Register of the West	1
Historical and Philosophical Society of Ohio	1
Mercantile Library	1
John G. Anthony	1

D.—*Addressed packages received by the Smithsonian Institution, &c.*—Continued.

	No. of packages.
CLINTON, NEW YORK.	
Observatory of Hamilton College	1
Dr. C. H. F. Peters	2
COLUMBIA, MISSOURI.	
Geological Survey of Missouri	8
COLUMBIA, PENNSYLVANIA.	
Professor S. S. Haldeman	1
COLUMBUS, OHIO.	
Ohio State Board of Agriculture	51
State Library	4
Leo Lesquereux	2
CONCORD, NEW HAMPSHIRE.	
New Hampshire Historical Society	1
State Library	4
DES MOINES, IOWA.	
State Library	21
DETROIT, MICHIGAN.	
Michigan State Agricultural Society	15
Lieutenant Colonel J. D. Graham	6
Dr. Tappan	1
DORCHESTER, MASSACHUSETTS.	
Dr. Edward Jarvis	1
EAST GREENWICH, NEW YORK.	
Asa Fitch	3
EASTON, PENNSYLVANIA.	
Prof. J. H. Coffin	1
FRANKFORT, KENTUCKY.	
Geological Survey of Kentucky	10
State Library	4
GAMBIER, OHIO.	
Kenyon College	5
GEORGETOWN, D. C.	
Georgetown College	5
Dr. H. King	1
A. Schott	2
HARRISBURG, PENNSYLVANIA.	
State Library	6
State Lunatic Asylum	1
HARTFORD, CONNECTICUT.	
Historical Society of Connecticut	1
State Library	4
HAVANA, CUBA.	
Royal Economical Society	2
HUDSON, OHIO.	
Western Reserve College	4
Professor Charles A. Young	1
INDIANAPOLIS, INDIANA.	
Indiana Historical Society	1
State Library	4
IOWA CITY, IOWA.	
State University	13
JACKSONVILLE, ILLINOIS.	
Institution for the Blind	1
JANESVILLE, WISCONSIN.	
State Institution for the Blind	3
JEFFERSON CITY, MISSOURI.	
Historical Society of Missouri	1
State Library	4
LANCASTER, OHIO.	
Dr. J. M. Bigelow	1
LANSING, MICHIGAN.	
State Agricultural College	1
State Library	4
LEON, NEW YORK.	
T. Apoleon Cheney	2
LITTLE ROCK, ARKANSAS.	
State Library	3
LOUISVILLE, KENTUCKY.	
Colonel Long	1
Professor J. Lawrence Smith	1
Dr. L. P. Yandell	1

D.—*Addressed packages received by the Smithsonian Institution, &c.*—Continued.

	No. of packages.
MADISON, WISCONSIN.	
Historical Society of Wisconsin	2
Skandinaviske Presse-Forening	1
State Agricultural Society	16
State Library	9
MONTPELIER, VERMONT.	
Historical and Antiquarian Society of Vermont	1
State Library	6
Albert Hager	1
MONTREAL, CANADA EAST.	
Natural History Society	11
Professor Billings	2
Thomas E. Blackwell	1
Professor J. W. Dawson	3
Sir W. Logan	2
Professor T. S. Hunt	1
M. Toly de Lotbinière	1
NEW BRUNSWICK, NEW JERSEY.	
Geological Survey of New Jersey	2
Professor George H. Cook	3
NEW HAVEN, CONNECTICUT.	
American Journal of Science and Arts	32
American Oriental Society	14
Yale College	1
Professor J. D. Dana	18
Professor E. Loomis	5
Professor B. Silliman	21
Professor W. D. Whitney	4
NEW ORLEANS, LOUISIANA.	
New Orleans Academy of Natural Sciences	13
NEW YORK, N. Y.	
American Agriculturist	1
American Ethnological Society	2
American Geographical and Statistical Society	29
American Institute	1
Astor Library	5
Farmer and Mechanic	1
Historical Society	2
Journal of Pharmacy	1
Medical College	1
New York City Lunatic Asylum	1
New York Dental Journal	1
New York Lyceum of Natural History	53
NEW YORK, N. Y.—Continued.	
University	1
W. Cooper	1
Dr. Draper	3
Dr. Daniel Eaton	2
T. Egleston	1
D. G. Elliot	1
T. W. Greene	1
Dr. Harper	1
C. F. Jung	2
G. N. Lawrence	2
Charles B. Norton	1
Edward Norton	3
Baron Ostensacken	7
Temple Prime	3
John H. Redfield	1
James Renwick	1
Dr. John Torrey	1
Mr. Wheatley	1
NORTHAMPTON, MASSACHUSETTS.	
Mr. Lyman	7
OLYMPIA, WASHINGTON TERRITORY.	
Territorial Library	2
OMAHA, NEBRASKA.	
State Library	5
OWEGO, NEW YORK.	
Mr. Pumpelly	5
PEORIA, ILLINOIS.	
Dr. Brendel	1
PHILADELPHIA, PENNSYLVANIA.	
Academy of Natural Sciences	114
American Philosophical Society	56
Central High School	1
Dental Cosmos	1
Entomological Society	4
Franklin Institute	14
Historical Society of Pennsylvania	3
Institution for the Blind	3
Wagner Free Institute	3
Dr. Allen	1
A. D. Brown	1
Lorin Blodget	1
J. Cassin	1
F. Clay	1
T. A. Conrad	1
Dr. E. D. Cope	4
E. T. Cresson	1

D.—*Addressed packages received by the Smithsonian Institution, &c.*—Continued.

	No. of packages.
PHILADELPHIA, PA.—Continued.	
E. Durand	2
Professor Haldeman	2
Dr. Isaac Lea	12
Dr. J. L. Le Conte	6
Dr. Joseph Leidy	8
H. Norton	1
G. Ord	1
William Sharswood	4
H. S. Tanner	1
George W. Tryon	1
Professor Wagner	1
Horatio C. Wood	1
PRINCETON, NEW JERSEY.	
Professor A. Guyot	6
PROVIDENCE, RHODE ISLAND.	
Rhode Island Historical Society	2
State Library	4
Professor A. Caswell	2
QUEBEC, CANADA EAST.	
Astronomical Observatory	1
Laval University	1
Literary and Historical Society	2
QUINCY, ILLINOIS.	
Dr. John Ritter	1
ROCK ISLAND, ILLINOIS.	
Dr. Velie	1
Benjamin D. Walsh	2
RYE, NEW YORK.	
John C. Jay	1
SACRAMENTO, CALIFORNIA.	
State Library	3
ST. LOUIS, MISSOURI.	
Deutsche Institute für Förderung der Wissenschaften	1
St. Louis Academy of Sciences	86
St. Louis University	1
Dr. George Bernays	1
Dr. George Engelmann	5
Dr. Adam Hammer	1
Dr. B. F. Shumard	10
John Wolf	1
ST. PAUL, MINNESOTA.	
Historical Society of St. Paul	2
SALEM, MASSACHUSETTS.	
Essex Institute	2
SAN FRANCISCO, CALIFORNIA.	
California Academy of Natural Sciences	25
Professor W. P. Blake	4
SANTIAGO, CHILI.	
University	3
SPRINGFIELD, ILLINOIS.	
State Agricultural Society	1
State Library	4
STOCKTON, CALIFORNIA.	
State Lunatic Asylum	1
TORONTO, CANADA WEST.	
Bureau of Agriculture and Statistics	1
Canadian Institute	7
Magnetical and Meteorological Observatory	1
University College	1
TOPEKA, KANSAS.	
State Library	6
TRENTON, NEW JERSEY.	
State Library	4
UTICA, NEW YORK.	
State Lunatic Asylum	1
WASHINGTON, D. C.	
Bureau of Ordnance and Hydrography	1
Library of Congress	4
National Observatory	83
Navy Department	3
Ordnance Bureau	2
Revenue Department	1
Secretary of State	1
Surgeon General United States Army	3
Topographical Bureau	1
United States Coast Survey	23
United States Patent Office	120

D.—*Addressed packages received by the Smithsonian Institution, &c.*—Continued.

	No. of packages.		No. of packages.
WASHINGTON, D. C.—Continued.		WASHINGTON, D. C.—Continued.	
War Department	6	T. Pösche	1
Colonel J. G. Abert	4	Captain John Rodgers	1
Professor A. D. Bache	20	S. W. Simm	1
Dr. E. Coues	1	H. R. Schoolcraft	1
Theo. Gill	1	Dr. W. Stimpson	5
Captain J. M. Gilliss	24	W. A. Treadway	1
General Emory	2	H. Ulke	1
Mr. Glover	1	Baron Von Gerolt	1
Dr. F. V. Hayden	1	Captain Charles Wilkes	2
Professor Hubbard	1	John Xantus	1
General A. A. Humphreys	1		
Colonel S. H. Long	1	WORCESTER, MASSACHUSETTS.	
D. Smith McCauley	1		
Professor G. A. Matile	1	American Antiquarian Society	4

Total of addresses	273
Total of parcels	1,522

MUSEUM AND COLLECTIONS.

It is gratifying to be able to state that the interest in the subject of natural history, which received so material a check in 1861, and showed symptoms of revival in 1862, has continued to manifest itself still more strongly during the year 1863. No better indication of this could be found than in the increase in the number of collections received by the Institution, which amounted to 264 distinct donations in 1863, while, in 1862, there were but 124.

Among the collections received have been many specimens of great interest; some, the results of special explorations under the auspices of the Institution for developing the natural history of portions of this continent; others, the spontaneous offerings of correspondents; and others, again, exchanges received in return for donations of specimens on the part of the Institution. No additions have been made by purchase, the Institution not having funds at its command for this purpose. It has, nevertheless, been found that a given amount of money can be better applied in meeting the expenses of explorations in particular regions than in buying collections already made. The results thus obtained are usually more varied in their character, and more important, from having been accomplished under definite instructions, and with special reference to the acquisition of facts and information additional to that which would be furnished by the specimens themselves. It is not merely specimens of natural history that are secured in the course of the several explorations, but information is obtained respecting the habits of animals, the ethnological peculiarities of human races, the meteorology, the physical geography, the geology of the country, &c.

EXPLORATIONS.

Among the explorations wholly or partially carried on under the auspices of the Smithsonian Institution, and furnishing results of more or less interest, may be mentioned the following:

Explorations by Mr. Kennicott.—A brief mention was made in the last report of the return of Mr. Kennicott, late in 1862, after an absence of nearly four years in the north, his movements while there having previously been indi-

cated in the reports of 1859, 1860, and 1861. By the arrival of all his collections, and those of gentlemen connected with the Hudson's Bay Company, who have so liberally aided him and the Institution in the effort to develop a knowledge of the natural and physical history of the north, we are now enabled better to realize the magnitude of the results of these operations. The collections received in 1863 (which include some which should have arrived in the end of 1862) filled forty boxes and packages, many of them of large size, and weighing, in the aggregate, about 3,000 pounds. They embraced thousands of kins of birds and mammals, eggs of nearly all the birds nesting in the north, numerous skulls and skeletons of animals, fishes in alcohol and preserved dry, insects, fossils, plants, &c.

Not in any way inferior in interest and importance to the natural history collections were those relating to the ethnological peculiarities of the Esquimaux and different tribes of Indians inhabiting the Arctic regions. It is believed that no such series is elsewhere to be found of the dresses, weapons, implements, utensils, instruments of war and of the chase, &c., &c., of the aborigines of Northern America.

The cataloguing and labelling of the specimens last received is now nearly completed, and Mr. Kennicott will then proceed to make a detailed report of the scientific results of his operations, as well as those of the various gentlemen of the Hudson's Bay service who co-operated in the work. The materials at his command will serve to fix with precision the relationships of the arctic animals to those of more southern regions, their geographical distribution, their habits and manners, and other particulars of interest, and to extend very largely the admirable records presented by Sir John Richardson relative to arctic zoology.

The Institution has already acknowledged, in many ways, its indebtedness to the Hudson's Bay Company, as well as to its officers, for their numerous favors—the company itself, through its secretary, Mr. Thos. Fraser, of London; the governors, Sir George Simpson and Mr. Dallas; Mr. E. M. Hopkins, the secretary at Montreal; the chief factors, Governor Wm. McTavish, Mr. George Barnston, Mr. John McKenzie, Mr. J. A. Grahame, Mr. Wm. Sinclair; the chief traders, Mr. B. R. Ross, Mr. W. L. Hardisty, Mr. R. Campbell, Mr. Jas. Lockhart, and others, together with Mr. R. W. MacFarlane, Mr. L. Clarke, Mr. S. Jones, Mr. J. S. Onion, the Rev. W. W. Kirkby, Messrs. Andrew and James Flett, Mr. C. P. Gaudet, Mr. John Reid, Mr. Harriot, and others—all have lent their aid towards the accomplishment of the work—every possible facility was given to Mr. Kennicott, every privilege granted within the rules of the company. At all the posts he was an honored guest, and he and his collections and outfit were transported from point to point in the company's boats and sledges without charge.

In addition to collections from the region traversed by Mr. Kennicott in his four years' exploration, some valuable specimens have been received from other points of British North America. Conspicuous among these is a series of birds and eggs from Rigolette, in Labrador, gathered by Mr. Henry Conolly, of the Hudson's Bay Company's service, and brought to Boston, without charge, by Mr. J. W. Dodge. This collection embraced specimens of the rare Labrador falcon, and others of much interest. A collection of birds and other objects of natural history, made at Moose Factory, for the Institution, by Mr. John McKenzie, has reached London by ship from Hudson's Bay, and may shortly be expected in Washington.

Exploration of Western Mexico by Mr. Xantus.—In my last report I mentioned that Mr. John Xantus, so long and so well known in connexion with explorations about Fort Riley, Kansas, Fort Tejon, California, and Cape St. Lucas, was about proceeding to a new field of operations. He left New York on the 11th of December, 1862, for Manzanillo, Mexico, the Panama Railroad

Company and the Pacific Mail Steamship Company, with that liberality they have so steadily exhibited in their transactions with the Institution, having given free passage over their respective routes to himself and his outfit. Mr. Xantus arrived at Manzanillo early in January, 1863, and making this and Colima his principal points of departure, extended his explorations in various directions, especially among the mountain regions. He is still occupied in his labors, the field being very extensive and of varied interest. Many of his collections have already been received, and found to contain numerous species of birds, reptiles, fishes, shells, &c., new to science, while others throw much light on the geographical distribution of the plants and animals of Mexico and Central America.

Explorations in Costa Rica.—For some time past much attention has been directed by naturalists toward the natural history of Costa Rica, a region which, from its peculiar physical conformation, indicated a fauna quite different from that of the adjacent states. The birds were particularly sought after owing to the many remarkable forms, brought to light by travellers. It was, therefore, with no little gratification that a collection of birds, made by Dr. A. Von Frantzius, an eminent naturalist and physician, resident in Costa Rica, aided by the Hon. C. N. Riotte, United States minister, and Mr. J. Carniol, was received a few months ago at the Institution. A careful examination of these specimens proved that the peculiar interest of the fauna had not been overestimated, a large proportion of the species being either new, or but recently described. Additional collections, shortly expected from Dr. Von Frantzius, will, it is hoped, increase still more our knowledge of the species.

Miscellaneous explorations in Mexico.—For several years past a highly valued meteorological correspondent of the Institution, Dr. Charles Sartorius, of Mirador, has made contributions of specimens of the natural history of his vicinity. During the year several collections were received from him of much interest and importance, especially certain species of Mexican deer, recently described, and but little known. As Dr. Sartorius, aided by his son, Mr. Florentin Sartorius, is now engaged in preparing an account of the animals of eastern Mexico, with special reference to their habits, &c., it is a source of gratification to us to have it in our power to aid him by identifying the species from his specimens, which his remoteness from large collections and libraries prevents him from doing for himself. Prof. F. Sumichrast, of Orizaba, has also made valuable contributions of birds and mammals of Mexico, and proposes to renew these whenever the condition of the internal affairs of Mexico will allow of the transmission of his collections. Dr. G. Berendt, of Tabasco, is also occupied in a similar manner in the interest of science and of the Institution.

Explorations in Guatemala and the west coast of Central America.—Mr. Osbert Salvin, an eminent English ornithologist, who has spent many years in the exploration of Guatemala, has transmitted to the Institution a second collection of the birds of that region. As these contain specimens of most of his new species, and all have been carefully compared, as far as practicable, with the types, his series of birds is of especial value, as furnishing standards for the identification of other collections.

Additional collections of much interest continue to be sent to the Institution by Captain J. M. Dow, of the Panama Railroad Company, so frequently mentioned in my previous reports. Certain rare birds and fishes collected by him are especially noteworthy.

Trinidad.—A collection of nearly fifty species of birds of Trinidad was presented by Mr. Galody, United States consul at Antigua, embracing many species not formerly in possession of the Institution.

Jamaica.—Mr. W. T. March, from whom the Institution has already received extensive collections in Jamaican zoology, has again made an important contri-

bution of an extensive series of birds' nests and eggs, the materials upon which he based a memoir on the birds of Jamaica, transmitted to the Institution, to be published by the Philadelphia Academy of Natural Sciences, and printed in its proceedings for November, 1863.

Cuba.—Additional collections were received during the year from Mr. Charles Wright and Professor F. Poey, embracing new and rare species of birds, shells, reptiles, and fishes. Some collections, transmitted by Dr. J. Gundlach, have not yet reached us.

Ecuador.—The Hon. C. R. Buckalew, now United States senator, while United States minister, resident at Ecuador, made quite an extensive collection of the birds of that country, which he has lately presented to the Institution. Nearly all of the species thus obtained were new to the cabinet.

No collections of magnitude, from regions or localities other than American, have been received during the year. It is not the intention or expectation of the Institution to make general collections of the natural history of the globe, neither its space nor available funds warranting so broad a field of operations. By limiting its labor to America, a hope may be entertained of possessing, in time, a complete series of the animals of the continent.

Exotic collections, as far as they are spontaneously offered, and especially such as are necessary to illustrate the characters of American species, are always acceptable, and the specimens gathered by the government exploring expeditions, of which the Smithsonian Institution is the custodian, will always be carefully preserved; but any especial efforts towards the increase of the museum may advantageously be confined, as a general policy, to the New World.

The most important additions, it will be readily seen, relate to the class of birds. Desirous of extending the observations upon the birds of North America, as published in the ninth volume of the Pacific railroad report, a circular was issued by the Institution, which has been distributed by the State Department to the consular and diplomatic officers of the United States in the foreign portions of America, asking aid in completing the collection of birds; and important additions are expected from the request thus extended. The materials received will be used, in connexion with those already in possession of the Institution, in the preparation of catalogues and monographs relative to American ornithology.

Among the specimens received by the Institution during the year should especially be mentioned the great Ainsa or Tucson meteorite.

This meteorite was first discovered by the Jesuit missionaries in Sonora, by whom it was considered a great curiosity, exciting much speculation as to its origin. In 1735 the "Gran Capitan de las Provincias del Occidente, Don Juan Baptista Anza, was induced to visit the ærolite," and found it at a place called "*Los Muchaches,*" in the Sierra Madre, and, struck with its appearance, undertook to transport it to San Blas, then the nearest port of entry, with the view of carrying it to Spain. With this object it was brought as far as the Presidio, near Tucson, in Arizona, and left there on account of the difficulty of carrying it any further. After the withdrawal of the Spanish garrison it was taken into the town of Tucson, set up vertically, and used as a kind of public anvil, of which it bears marks at the present time. In this condition it was seen and reported upon by various travellers; among others it was visited by John R. Bartlett, July 18, 1852, at the time Commissioner of the United States and Mexican Boundary Survey. Mr. Bartlett gives a short account of it, (Personal Narrative, volume II, p. 297,) accompanied by a figure, (the lower one on the plate,) where it is represented as resting upon two legs, owing to the lower part of the ring, of which it consists, being buried in the ground. His estimate of six hundred pounds as its weight falls far within the actual amount.

In 1857, Dr. B. J. D. Irwin, United States army, then stationed at Fort Buchanan, south of Tucson, found this meteorite lying in one of the by streets of the village, half buried in the earth. As no one claimed it, he publicly announced his intention to take possession of it and forward it to the Smithsonian Institution, whenever an opportunity offered. Some time after, assisted by Mr. Palatine Robinson, of Tucson, (near to whose house the meteorite lay,) he succeeded in having it sent, by the agency of Mr. Augustine Ainza, to Hermosillo, where it remained for some time at the hacienda of Don Manuel Ynigo, father-in-law of Mr. Ainza.

In May, 1863, Mr. Jesus Ainza, brother of Mr. Augustine Ainza, and grandson of Doña Ana Ainza de Iglas, the daughter of Don Juan Bautista Ainza, visited Sonora, and on his return brought the meteorite with him to San Francisco, where it was delivered by his brother, M. Santiago Ainza, to the agent of the Smithsonian Institution, Mr. A. B. Forbes, of the Pacific Mail Steamship Company, and forwarded by him, *via* the Isthmus, to Washington, where it arrived in November, and is now on exhibition, and the great object of attraction to visitors in the Smithsonian hall. It is proper to state that, although Dr. Irwin was authorized to expend whatever was necessary to secure the transmission of the meteorite to San Francisco, beyond some small expenses paid by him for placing it upon the truck in Tucson, no charge was made by the Ainza family for the cost of transportation to Guaymas and delivery to the Pacific Mail Steamship Company, performed partly with their own wagons and partly by other means of conveyance. It was brought free of charge from Guaymas to San Francisco by the Flint and Haliday line of steamers. While on the route to New York the Pacific Mail Steamship Company and the Panama Railroad Company, with that liberality which has ever characterized their intercourse with the Smithsonian Institution, transported it without expense to Aspinwall, and thence to New York.

The meteorite is in the shape of an immense signet ring, much heavier on one side, where it is nearly flat on its outer surface, and presents the face used as an anvil. The greatest exterior diameter is 49 inches; width of thickest part of the ring 9 inches, the least 38 inches; the greatest width of the central opening, 23 inches; width of thickest part of the ring, 17½ inches. The weight is now 1,400 pounds, but some portions have been removed from time to time, probably reducing it considerably. Its composition is principally of iron, with small specks of a whitish silicious mineral diffused through it.

A careful chemical and physical examination of the meteorite will be made by Professor G. J. Brush, of New Haven, to whom the Smithsonian Institution has committed the subject for a detailed report.

As the ærolite was first brought from the mountains north of Tucson by the great grandfather of the gentleman to whose exertions in transporting it to Washington the Institution owes so much, it is proposed to call it the "Ainsa meteorite." To Dr. Irwin, of the United States medical department, the Institution is also under great obligations for his agency in securing this specimen.

Dr. Irwin states that the inhabitants of Tucson have a tradition that a shower of these meteorites took place in the Santa Catarina mountains about two hundred years ago, and that there are many other masses of a similar character yet remaining in those mountains.

This meteorite is among the largest known, and in this country is only exceeded a little in weight by the Gibbs meteorite in the cabinet of Yale College, New Haven, while it surpasses the latter in size, being disposed in the form of a ring instead of a solid mass.

The Smithsonian Institution also possesses the third largest meteorite in the country in the "Couch meteorite," weighing 252 pounds, and brought from Northeastern Mexico by Major General D. N. Couch, and by him presented to the Institution.

IDENTIFICATION OF SPECIMENS.

Continued progress has been made during the year in the determination and arrangement of the species in the Smithsonian collections, and the cabinet is gradually becoming more and more useful for reference and study. Any apparent shortcoming in this respect will be excused in view of the fact that the work done is mainly a voluntary contribution on the part of gentlemen engaged in making special examinations of the Smithsonian collections, and the Institution is under many obligations for their assistance.

DISTRIBUTION OF SPECIMENS.

In accordance with the plan of the Institution, as fast as the identification of the species is satisfactorily accomplished, the duplicate specimens are set aside for distribution to such museums at home and abroad as appear to be suitable recipients. The total number of objects thus distributed to the end of the year 1863, all properly determined and labelled, amounts to 26,651 species, and 50,601 specimens, as shown by the following schedule:

Statement of specimens of natural history distributed by the Smithsonian Institution up to December 31, 1863.

Specimens.	Prior to 1854.		1854 to July, 1861.		1861 to August, 1863.		Total.		Special distribution of shells of Exp'g Exp'n.	
	Species.	Specimens.	Species.	Specimens.	Species.	Specimens.	Species.	Specimens.	Species.	Specimens.
Mammals	5	5	404	624	172	216	581	845	.....	.....
Birds	825	1,035	3,162	4,255	1,787	2,494	5,774	7,784	.....	.....
Reptiles	18	22	1,470	2,356	18	18	1,506	2,396	.....	.....
Fishes	.....	.....	1,623	3,921	20	28	1,643	3,949	.....	.....
Crustaceans	.....	.....	936	1,894	.....	.....	936	1,894	.....	.....
Radiates	.....	.....	551	727	.....	.....	551	727	.....	.....
Mollusks	.....	.....	588	1,985	310	380	898	2,365	10,934	44,112
Invertebrates, insects, &c.	.....	.....	216	330	312	400	528	712	.....	.....
Eggs of birds	114	307	1,537	3,558	628	1,235	2,279	5,100	.....	.....
Fossil invertebrates	.....	.....	.....	.....	747	2,238	747	2,238	.....	.....
Fossil vertebrates	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Skulls	58	58	.....	.....	5	5	63	63	.....	.....
Minerals and rocks	.....	.....	.....	.....	211	354	211	354	.....	.....
Total	1,020	1,527	10,487	19,650	4,210	7,368	26,651	72,657	10,934	44,112

In the index to the three volumes of transmissions of specimens for examination, or donation, the names of two hundred and fifty-nine institutions and individuals are entered up to August, 1863.

N. B.—The preceding enumeration of specimens distributed does not include the specimens (duplicates) retained by collaborators in behalf of certain authorized collections—as of insects, by Messrs. Leconte, Uhler, Morris, Ostensacken, Saussure, Edwards, Hagen, Loew, Scudder, &c.; of vertebrate fossils, by Leidy, for the Philadelphia Academy; of fishes, by Professor Agassiz; shells, by Messrs. Carpenter, Binney, Tryon, &c.; mammals, by Messrs. Leconte, Allen, &c.; birds, by Mr. Cassin; reptiles, by Mr. Cope; plants, by Messrs. Torrey, Gray, Engelman, and Eaton. These will probably amount to at least 10,000 species, and 20,000 specimens additional.

The cataloguing of specimens in the record-books of the Institution has been continued during the year, and, as will be seen by the accompanying table, now amounts to 86,547 entries, being an increase, since 1863, of over 12,000.

Table showing the total number of entries on the record-books of the Smithsonian collection at the end of the years 1861, 1862, *and* 1863.

	1861.	1862.	1863.
Skeletons and skulls	4,459	4,750	6,275
Mammals	5,550	5,900	7,175
Birds	23,510	26,157	31,800
Reptiles	6,088	6,311	6,325
Fishes	3,643	4,925	5,075
Eggs of birds	4,830	6,000	7,275
Crustaceans	1,287	1,287	1,287
Mollusks	9,718	10,000	10,450
Radiates	1,800	2,675	2,725
Fossils	1,031	2,100	2,550
Minerals	3,500	3,725	4,925
Ethnological specimens	550	825	875
Annelids	105	109	110
Total	66,075	74,764	86,847

LIST OF DONATIONS TO THE MUSEUM OF THE SMITHSONIAN INSTITUTION IN 1863.

Atkins, L. S.—Eggs of birds and shells from Ohio.
Ainsa, J.—See Irwin.
Akhurst, J.—Birds from St. Thomas, West Indies.
Baer, O. P.—Unionidæ from Indiana.
Baird, S. F.—Iron ore from Hanover station; series of skins and eggs of birds, mammals, fishes, and invertebrates, from Wood's Hole and Cohasset, Massachusetts.
Baird, Mrs. S. F.—*Leuciscus*, from Potomac river.
Beadle, Rev. E. R.—Bergen Hill minerals.
Bean, W.—Collection of annelids and cirripeds of Great Britain.
Behrens, Dr.—Insects from California.
Berlin Museum.—54 skins of birds of Central and South America.
Bethune, Rev. C. S.—Skin of *Scalops breweri*, Canada.
Blackman, Mr.—Skins and eggs of birds, Illinois.
Blake, W. P.—Keg of fishes from Hakodadi, Japan.
Bland, Thomas.—*Spiraxis*, from West Indies.
Boardman, George A.—Embryo Canada grouse in alcohol; skins and eggs of birds.
Bouvè, Thomas T.—Large crystals of beryl.
Brass, W.—Birds, mammals, &c., Fort Halkett.
Brevoort, J. C.—Fresh specimen of *Zoarces anguillaris*.
Bruckart, H. G.—Insects from Lancaster county, Pennsylvania.
Buckalew, Hon. C. R.—Collection of birds of Ecuador.
Burling, W.—Skin of *Haliætus pelagicus* from the Amoor river. (Through Samuel Hubbard.)
Carniol, J.—Skins of Costa Rican birds.
Carpenter, P. P.—Fossils from vicinity of Moscow.
Carpenter, Robbie S.—Skin of starling, *Sturnus vulgaris*, Warrington, England.
Clark, Lawrence.—A general zoological collection from Fort Rae, Great Slave lake.
Colcman, Lyman.—Seeds of Damascus thorn; petrified wood from Cairo.
Coleman, W. T.—Birds and eggs from Canada.
Comstock, A.—Cuttings of California grapes.

Conolly, H.—Skins and eggs of birds from Labrador.
Cooper, Dr. J. G.—Shells of California.
Coues, Dr. E.—Series of skins of birds of District of Columbia.
Cowles, P. W.—Insects from Vicksburg.
Crosier, Dr. E. S.—Vorticella, &c., New Albany, Indiana.
De Saussure, Dr. H.—Skins of Mexican birds, and lacustrian antiquities of Switzerland.
Diebitsch, Professor H.—Rana pipiens.
Dodd, P. W.—Skulls of animals and eggs of birds from Sable island.
Dow, Captain J. M.—Skins of mammals, and birds, fishes, &c., from west coast of Central America.
Drew, Dr. F. P.—Collection of reptiles and eggs of birds from Kansas.
Drewsen, Charles.—Series of Greenland shells.
Drexler, C.—Series of skins of birds of the District of Columbia.
Egleston, Thomas.—Series of European fossils.
Elliot, D. G.—Skins of European gulls; skins of humming birds.
Elliot, H. W.—Large collection of Unionidæ; shells, &c., in alcohol, Ohio.
Engelmann, Dr.—Fossils from Illinois.
Fairbanks, Professor.—Box of eggs.
Fay, Joseph S.—Chlorastrolite from Lake Superior.
Flett, Andrew.—Skins and eggs of birds; Fort Normann.
Flett, James.—Eggs of birds, &c., from La Pierre's house.
Foreman, Dr. E.—Five boxes of minerals from Maryland.
Freiburg, Mining Academy of.—Box of mineralogical and geological specimens from Germany.
Frick, Dr.—Shells of California and Japan.
Galody, M.—Skins of birds of Trinidad.
Gaudet, C. P.—Skins and eggs of birds, &c., from Peel's river.
Gibbs, George.—Indian curiosities.
Gilliss, U. S. N., Captain.—Six boxes of microscopic soundings.
Gilpin, Dr. J. B.—Series of shrews and mice of Nova Scotia.
Goldsmith, Dr. M.—Cricket from the Mammoth Cave, Kentucky.
Gould, Dr. A. A.—Forty species of *Melaniadæ*.
Grahame, J. A.—Skins of mammals, &c., Norway House.
Giebel, Dr. C.—Three boxes of insects of Europe, (365 species.)
Gruber, Ferd.—Skins and eggs of birds from California.
Gundlach, Dr. J.—Specimens of *Gundlachia*, Cuba.
Gunn, Donald.—Skins and eggs of birds from Red River settlement and Lake Winipeg.
Haldeman, Professor S. S.—Types of the species of *Melaniadæ* described by him.
Hall, W. F.—Birds and eggs from Massachusetts.
Hamilton, R.—Collection of skins and eggs of birds from Great Whale river, (through Mr. George Barnston.)
Hardisty, W. L.—Birds, mammals, &c., from Fort Liard.
Harris, W. O.—Minerals from Chester county.
Harriot, Mr.—Skins of birds from Fort Anderson.
Hays, Dr. W. W.—Fishes, &c., from Sacramento river.
Hayden, Dr. F. V.—Alcoholic specimens, Beaufort, South Carolina.
Haymond, Dr. R.—*Cypris* from Indiana.
Hepburn, James.—Skins and eggs of birds from the Pacific coast.
Hibbard, Francis.—Lead ore from New Brunswick.
Hibbard, James.—Antimony ores, New Brunswick.
Hitz, R. B. & George.—1,200 eggs, of twelve species of birds, from Northampton county, Virginia, with shells, &c. (See also Stimpson.) Fossils from Aquia creek.

Hoge, Mr.—Skin of boa from the Serapiqui river.
Hope, John.—Eggs of birds, fishes, &c., Great Bear lake.
Hotaling, C. F.—Rock salt from Louisiana.
Hoxie, W.—Insects from Massachusetts.
Hoy, Dr. P. R.—Nests and eggs from Racine.
Hunt, General L. C.—Indian knife, Klamath lake.
Irwin, Dr. W. W., and J. Ainsa.—Meteorite from Tucson, weighing 1,400 pounds.
Jeffreys, Mr.—Box of minerals of Chester county, Pennsylvania.
Jones, Strachan.—Eggs of birds, &c., from the Yukon.
Julian, A. A.—Series of fishes, &c., Sombrero island.
Keep, Rev. Marcus R.—Moose horns from Maine.
Kennedy, Dr. H. W.—Collection of reptiles of Uruguay.
Kennicott, R.—Insects, eggs, &c., from Illinois.
Kennicott, R., and others.—Fifteen boxes, three bales, one keg, and one chest of Arctic collections. Mr. Kennicott's collections principally from the mouth of the Porcupine river, Peel's river, Fort Good Hope, La Pierre's house, Fort Resolution, &c.
Kirtland, Dr. J. P.—Two boxes of western *Unionidæ*.
Krefft, Dr. G., (through W. Cooper.)—Collection of Australian reptiles.
Krider, John.—Mounted hawks.
Lapham, I. A.—*Unionidæ* of Wisconsin.
Lawrence, George N.—Skins of birds from Central America and Panama.
Lea, Isaac.—Box of *Unionidæ*, and one hundred species of *Melaniadæ*.
Lewis, James, Dr.—Large collection of land and fluviatile shells from the interior of New York.
Lockhart, James.—Large series of zoological specimens, principally birds' eggs, from the Yukon; skins of birds, mammals, eggs, &c., from Fort Resolution.
Lykins, W. H. R.—Fossils from Kansas.
MacFarlane, R. W.—A general zoological and ethnological collection from vicinity of the Anderson river, Arctic America.
McGuire, J. C.—Two boxes of *Unionidæ*.
McKenzie, Hector.—Birds' eggs from Red river.
McKenzie, J.—Birds, &c., from Fort Resolution.
McKenzie, Roderick.—Birds' eggs from Lake Manitobah.
McMurray, W.—Birds' eggs from Winipeg river.
MacTavish, Gov. William.—Skins and eggs of birds, &c., from the Red River country.
Mann, William.—Skins of *Pinicola canadensis*, Lake Superior.
March, W. Thomas.—Three boxes of skins, nests and eggs of Jamaican birds.
Meek, F. B.—Series of fossils from New Jersey and Maryland.
Moore, Carleton R.—Double tail of *Limulus*.
Michener, Dr. E.—156 crania of birds, and 54 of mammals; two boxes of minerals.
Onion, J. S.—Plants, eggs, &c., from Fort Good Hope.
Palmer, Dr. E.—Fossils, minerals, &c., Pike's Peak.
Parker, Rev. H. W.—Marine shells, United States, and two boxes of minerals from New Bedford.
Parkinson, D. T.—Skins and eggs of birds, Indian skulls, plants, &c., Fort Crook, California.
Philadelphia Academy of Natural Sciences.—Seventy species of *Melaniadæ*.
Piper, Col., (10th regiment New York volunteer artillery.)—Rock specimens and fossil wood from Fort Meigs, near Washington.
Poey, Prof. F.—Collection of bats and *Neuroptera;* fishes from Cuba.
Poole, Henry—"Cone in cone" in slate. From a shaft sunk in the Harbor Vein coal seam, Little Glacé Bay, Cape Breton.

Prentiss, D. W.—Series of skins of birds of the District of Columbia.
Quackenbush, Leslie R.—Fossils of the Utica slate.
Reed, John.—Skins and eggs of birds from Big Island, Great Slave Lake. One collection through L. Clarke, jr.
Reed, Peter.—*Sorex platyrhinus,* Washington county, New York.
Richards, Thos.—Skins of birds, &c., from Temiscamingue.
Riotte, Hon. C.—Reptiles and insects in alcohol, skins of birds, shells, &c., Costa Rica.
Ritchie, J. P.—Skin and egg of *Buteo pennsylvanicus* from Massachusetts.
Rodgers, Commodore John.—Ethnological collections of the North Pacific Exploring Expedition.
Ross, B. R.—A general zoological collection from Fort Simpson and vicinity.
Rousseau, E.—Box of shells from New York.
Saemann, L.—Box of European minerals.
Salisbury, Dr. S. H.—*Scalops* in alcohol from Fairfield county, Ohio.
Salle, A.—Skins of Mexican birds.
Salvin, O.—Collection of birds of Guatemala, (150 species.)
Sartorius, Dr. C.—Collection of birds, mammals, alcoholic specimens, &c., Mexico.
Schmidt, Dr.—Birds from the vicinity of Washington, collected by the late Chas. F. Schmidt.
Sclater, Dr. P. L.—Skins of Mexican birds.
Simpson, George B.—Copper spear-head, and other relics.
Sitka, Governor of.—Box of crustacea. (Through Mr. Jas. Hepburn.)
Springer, P. M.—Skins and sterna of birds, Illinois.
Stimpson, Dr. W.—Three boxes of marine invertebrates of Great Britain; two of American.
Stimpson, Dr. W. and R. B. Hitz.—Three boxes shells, eggs, &c., Northampton county, Virginia.
Sumichrast, Prof. F.—Mammals and birds of Mexico.
Surgeon General.—Tertiary fossils, Suffolk, Virginia.
Swan, J. G.—Indian curiosities, skins of birds, eggs, shells, fishes, &c., from Puget Sound.
Thomson, J. H—Box of New England shells.
Tolman, J. W.—Skins and eggs of birds of Illinois.
Trumbull, George.—Wavellite from Chester county.
Tryon, G. W.—One hundred and twenty-five species of *Melaniadæ.*
Ulke, H.—Skins of birds from Illinois.
Van Cortlandt, Dr. E.—Mammals in alcohol, skins of *Lepidosteus,* &c., from Ottawa.
Frantzius, Dr.—Collection of birds and mammals from Costa Rica.
Velie, Dr. J. W.—Eggs of *Protonotaria citrea,* &c, from Illinois.
Vienna Geologisches Reichs-Anstalt.—Collection of Austrian fossils.
Walker, R. O.—Fishes, shells, skulls, &c., Allegheny county, Pennsylvania.
White, Dr.—Marine shells and skulls of mammals, Isthmus, Panama.
Willis, J. R.—Shells, eggs, and fishes of Nova Scotia.
Williams College Lyceum,—Eggs of Greenland birds.
Wilson, N.—Seeds of plants from Jamaica. (Through Thos. Bland.)
Wingate, J. D.—Box of shells, Bellefonte, Pennsylvania.
Woodworth, Dr. J. M.—Reptiles and insects from Memphis.
Wouton, W. G.—Skins and eggs of birds of Nova Scotia.
Wright, Chas.—Birds, shells, and insects of Cuba.
Wynne, Dr. Jas.—Specimen of sphinx or hawk moth from Central America.
Xantus, John.—Fourteen boxes of mammals, birds, and other animals, plants &c., from Manzanillo, Colima, &c.

LIST OF WORKS PUBLISHED IN 1863.

(155.) Ancient Mining on the Shores of Lake Superior. By Charles Whittlesey. 4to., pp. 32, and one map. (Published April, 1863.)

(146.) Meteorological Observations in the Arctic Seas. By Sir Leopold McClintock, R. N. Made on board the Arctic searching yacht "Fox," in Baffin's Bay and Prince Regent's Inlet in 1857, 1858, and 1859. Reduced and discussed at the expense of the Smithsonian Institution by Charles A. Schott, Assistant United States Coast Survey. 4to., pp. 160, and one map.

A small edition of this work was published in May, 1862, but the final issue, with corrections and additions, took place in 1863.

(166.) Records and Results of a Magnetic Survey of Pennsylvania and parts of adjacent States in 1840 and 1841, with some additional Records and Results of 1834, 1835, 1843, and 1862, and a map. By A. D. Bache, LL.D., F. R. S., Member of Corresponding Academy of Sciences, Paris; President of National Academy of Sciences; Superintendent United States Coast Survey. 4to., pp. 88, and one map. (Published October, 1863.)

(169.) Researches upon the Anatomy and Physiology of Respiration in the Chelonia. By S. Weir Mitchell, M. D., and George R. Morehouse, M. D. 4to., pp. 50. (Published April, 1863.)

(156.) Catalogue of Minerals, with their Formulas, &c. Prepared for the Smithsonian Institution by T. Egleston. 8vo., pp. 42.

(140.) List of the Coleoptera of North America. Prepared for the Smithsonian Institution by John L. Leconte, M. D. Part I. 8vo., pp. 60. (Published March, 1863.)

(167.) New Species of North American Coleoptera. Prepared for the Smithsonian Institution by John L. Leconte, M. D. Part I. 8vo., pp. 94. (Published March, 1863.)

(142.) Bibliography of North American Conchology previous to the year 1860. Prepared for the Smithsonian Institution by W. G. Binney. Part I. American authors. 8vo., pp. 658. (Published March, 1863.)

(171.) Monograph of the Diptera of North America. Prepared for the Smithsonian Institution by H. Loew. Part II. Edited by R. Ostensacken. 8vo., pp. 340. (Published January, 1864.)

(160.) Instructions relative to the Ethnology and Philology of America. Prepared for the Smithsonian Institution by George Gibbs. 8vo., pp. 36. (Published March, 1863.)

(161.) A Dictionary of the Chinook Jargon or Trade Language of Oregon. Prepared for the Smithsonian Institution by George Gibbs. 8vo., pp. 60. (Published March, 1863.)

Systematic index to the list of foreign correspondents of the Smithsonian Institution, corrected to January, 1862. 8vo., pp. 16.

Appendix to the list of foreign correspondents of the Smithsonian Institution, corrected to January, 1863. 8vo., pp. 7.

(170.) Comparative Vocabulary. Reprinted from the Smithsonian Instructions relative to ethnology and philology. 4to., pp. 20. (Published May, 1863.)

WORKS STILL IN PRESS.

(174.) Bibliography of North American Conchology. By W. G. Binney. Part II. 8vo., 239 pages stereotyped.

(143.) Synopsis of Air Breathing Shells. By W. G. Binney. 8vo.

(144.) Synopsis of North American Vivipara, &c. By W. G. Binney. 8vo.

(145.) Monograph of American *Corbiculadæ*. By Temple Prime. 8vo., (42 pages in type.)

(177.) Check-list of North American Fossils; cretaceous formation. By F. B. Meek. 8vo.

(172.) Palæontology of the Upper Missouri. By F. B. Meek and F. V. Hayden. 4to.

(165.) Monograph of North American Bats. By Harrison Allen, M. D. 8vo.

(173.) On the Microscopic Structure of the Medulla Oblongata and the Trapezium. By Dr. John Dean. 4to.

(175.) Discussion of the Magnetic and Meteorological Observations of Girard College. By Prof. A. D. Bache. Part VII, VIII, IX. 4to.

(179.) List of publications of learned societies, periodicals, and encyclopædic works in the library of the Smithsonian Institution, July 1, 1863.

(178.) Monograph of North American Hymenoptera. By H. De Saussure. Part I. Edited by Edward Norton. 8vo.

LIST OF METEOROLOGICAL STATIONS AND OBSERVERS

OF THE

SMITHSONIAN INSTITUTION

FOR THE YEAR 1863.

Name of observer.	Station.	North latitude.	West longitude.	Height.	Instruments.*	No. of months received.
BRITISH AMERICA.						
		° ′	° ′	*Feet.*		
Acadia College	Wolfville, Nova Scotia	45 06	64 25	95	A	5
Baker, J. C	Stanbridge, Canada East	45 08	73 00	.....	T	12
Clarke, Lawrence, jr	Fort Rae, Great Slave Lake	.....	.....	.....	T	6
Connolly, Henry	Rigolet, Labrador	.....	.....	.....	B. T	2
Delaney, Edward M. J	Colonial Building, St. John's, Newfoundland.	47 35	52 40	170	B. T. R	4
Everett, Prof. J. D	King's College, Windsor, Nova Scotia.	44 59	64 07	200	A	6
Flett, Andrew	Fort McPherson, Hudson's Bay Territory.	68 00	135 00	200	T	1
Hall, Archibald, M. D	Montreal, Canada East	45 30	73 36	57	A	6
McFarlane, R.	Fort Anderson	68 30	127 30	.....	.....	4
	Fort George	.....	.....	.....	T	4
Magnetic Observatory	Toronto, Canada West	43 39	79 21	†108	A	12
Murdock, G	St. John, New Brunswick	.....	.....	.....	B. T. R	7
Phillips, H	Niagara, Canada West	43 09	79 20	270	A	1
Rankin, Colin	Michipicoton, Canada West	47 56	85 06	.....	B. T	12
Richards, Thomas	Kenogumissee, Hudson's Bay Territory.	49 50	84 00	1,000	T	4
MEXICO.						
Laszlo, Charles	San Juan Bautista, Tabasco	17 47	92 36	40	A	8
Sartorius, Dr. Charles	Mirador, Vera Cruz	19 15	96 25	3,600	A	11
CENTRAL AMERICA.						
Riotte, C. N	San José, Costa Rica	9 54	84 06	3,772	T. R	12
White, William T., M. D	Aspinwall	9 21	79 54	.....	A	12
WEST INDIES.						
United States Consul	Turk's Island	.....	.....	.....	.....	3
Julien, Alexis A	Sombrero Island	18 55	63 27	45	A	12
BERMUDA.						
Royal Engineers, (in the Royal Gazette.)	Centre Signal Station, Saint George's.	.....	.....	.....	A	12
SOUTH AMERICA.						
Hering, C. T	Government Plantation Rustenberg, colony of Surinam, Dutch Guiana.	.....	.....	.....	A	9

* A signifies Barometer, Thermometer, Psychrometer, and Rain Gauge.
B signifies Barometer.
T signifies Thermometer.
P signifies Psychrometer.
R signifies Rain Gauge.
N signifies no instrument.
† Above Lake Ontario.

REPORT OF THE SECRETARY.

To the Board of Regents of the Smithsonian Institution:

GENTLEMEN: The duty of presenting to you the annual report of the operations and state of the Smithsonian Institution recurs, on this occasion, under peculiar circumstances. On the 24th of last month, the day before that designated for the annual meeting of the Board, a fire occurred, of which an account is given in the Report of a Special Committee. It destroyed the documents contained in the Secretary's office, and among these was the manuscript of the annual report, which was ready for presentation. The destruction of this involved the necessity of rewriting the whole article, and has delayed its presentation until the present time.

Another circumstance which characterizes our present meeting is that, for the first time in the history of the Institution, not one of those who constituted the original Board of Regents is now in attendance. With the exception of a single member, (Professor Bache,) who is seeking in a foreign country the restoration of his health, an entire change has taken place in the personal composition of the Board. This change has been much more rapid during the last four years, or since the commencement of the war. Within that period, death has repeatedly cast its shadow over the Institution. Indeed, the number of those connected with the establishment who have departed this life since the epoch mentioned exceeds the number in all the years that preceded. The death of Judge Douglas, of Illinois, of Senator Pearce, of Maryland, and that of Dr. Felton, of Cambridge, all prominent members of the Board, were communicated at the last and the preceding meetings; and I have now to add, as having occurred since the last session, the death of General Totten, who was one of the Regents named in the original act of Congress organizing the Institution, and who continued during life to be an active member of the Board, and by repeated election, one of the executive committee; that of Chief Justice Taney, who ever evinced a lively interest in the welfare of the Institution, was one of the original members of the Board, and for a long time held the office of its chairman; and, lastly, that of Judge Dayton, whose decease, in the full enjoyment of

the honors of his high position as the representative of his country at the court of France, we have recently been called to mourn. Though the latter was unable to attend the meetings of the Board, he rendered good service to the Institution in extending its reputation and promoting its correspondence abroad. Besides this mortality among the Regents, there have also occurred in the same period four deaths among the assistants and employés of the establishment, and two among the honorary members, making twelve in number thus removed.

This rapidly recurring mortality has not failed to impress me profoundly with the instability and uncertainty of life, and has led me, in view of the late conflagration and the loss of the counsel of those to whose generous and zealous co-operation I have been so long indebted, to regard with more than usual solicitude the proper discharge of the responsible duties which are intrusted to me as the principal executive officer of the establishment.

Yet, however grieved at the loss occasioned by the fire, and saddened by the departure of those to whom I have just referred, I have not permitted myself for a moment to doubt that I shall continue to find in the present members the same cordial co-operation and liberal support which has characterized the guardians of the Institution for the past twelve years. Whatever may have been the diversity of views previous to that period, no difference of opinion has since been expressed as to the propriety of the general policy which has governed the operations of the establishment, nor has a doubt been intimated as to the value of the results produced or their strict conformity with the intentions of Smithson. This harmony is, perhaps, more worthy of remark, when it is remembered that in the choice of the Regents they have been designedly selected by Congress from each of the prominent political parties of the day. Men of the most conflicting opinions meet here as on a common ground of friendly sympathy, impressed with the feeling that rivalry and prejudice should hold no sway in the presence of interests whose universality and permanency properly withdraw them from the sphere of popular and temporary excitement. Hence my enforcement of the rule excluding from the lecture-room of the Institution topics of a partisan and irritating character has been fully sustained; while, at the same time, the course which has been pursued of rendering the government in its late trials every aid which could be supplied by scientific research has been warmly approved.

As most persons are probably entirely ignorant of the services

really rendered to the government by the Institution, I may here state the fact that a large share of my time—all, indeed, which could be spared from official duties—has been devoted for the last four years to investigations required by the public exigencies. Within this period several hundred reports, requiring many experiments, and pertaining either to proposals purporting to be of high national importance, or relating to the quality of the multifarious articles offered in fulfilment of legal contracts, have been rendered. The opinions advanced in many of these reports not only cost much valuable time, but also involved grave responsibilities. While, on the one hand, the rejection of a proposition would be in contravention to the high importance claimed for it by its author, on the other the approval of it would perhaps incur the risk of the fruitless expenditure of a large amount of public money. It is not necessary, I trust, to say that the labor thus rendered was entirely gratuitous, or that in the judgment pronounced in any case no regard was paid to the interested solicitations or personal influence of the parties concerned; on the contrary, it has in some instances resulted from the examination of materials sold to the government that attempted fraud has been exposed and the baffled speculator received his due reward in condemnation and punishment. These facts, it is thought, will be deemed a sufficient answer to those who have seemed disposed to reproach the Institution with the want of a more popular demonstration, but far less useful or efficient aid in the support of the government.

At the close of 1864 the affairs of the Institution were in a highly prosperous condition. It will be seen by a reference to the report of the executive committee that—

First. The whole amount of money originally derived from the bequest of Smithson is still in the treasury of the United States, bearing interest at six per cent., paid semi-annually, and yielding $30,910.

Second. Seventy-five thousand dollars of an extra fund are in bonds of the State of Indiana, at five per cent. interest, also paid semi-annually, yielding $3,750.

Third. Fifty-three thousand five hundred dollars of the same fund are in bonds of the State of Virginia, twelve thousand in those of Tennessee, and five hundred in those of Georgia, from which nothing has been derived since the commencement of the war.

Fourth. A balance of upwards of $29,000 is now in the hands of the treasurer of the Institution. The only difference in this state-

ment and that of last year is that the balance now in the hands of the treasurer is $2,500 less than before. This difference is mainly due to the increase of prices and the consequent necessity of a greater expenditure in carrying on the ordinary operations.

In view of the great expenditures of the government on account of the war, the Institution did not at first claim, as it might reasonably have done, to have the annual income from the original bequest paid in specie, as all the older funded debts of the United States are paid. But since a large outlay will be required to repair the damages caused by the fire, the necessity could not be avoided of calling the attention of the Secretary of the Treasury to this measure. That this claim is a just one was the unanimous opinion of the Board of Regents, and among them of Chief Justice Chase, and in accordance with the instructions of the Board I have presented this matter to the department. It was referred by the Secretary to his legal adviser, the Solicitor of the Treasury, who has decided that in accordance with the usage of the government the Institution is entitled to receive the interest from the original bequest of Smithson in coin. The premium on this will therefore, in future, increase the balance in the hands of the treasurer.*

It was mentioned in the last report that a part of the original bequest, amounting to £5,015, was left by Mr. Rush in England as the principal to secure an annuity payable to the mother of Smithson's nephew. The annuitant having died, a power of attorney was sent in November, 1862, to Messrs Fladgate, Clark and Finch, (the same firm originally employed by Mr. Rush,) to collect the money. After a considerable delay, arising principally from technical difficulties, the money was obtained and deposited to the order of the Institution, with George Peabody & Co., bankers, London. It was subsequently drawn through the agency of the Secretary of the Treasury, and, in accordance with the law of Congress directing that the money of the Smithsonian bequest should be invested in United States securities, it was expended in the purchase of government bonds, bearing interest at the rate of $7\frac{3}{10}$ per cent. The amount realized in bonds of this denomination, at par, was $54,150. It was at first supposed that this money, or at least the interest upon it, could immediately be applied to the uses of the Institution, but from a critical examination of the enactments of Congress in reference to the Smithsonian fund,

* The premium on the coin received since the presentation of the report, on account of the interest due 1st January, was $7,472 70, which sum added to $29,484 08 gives $36,956 78 as the amount in the hands of the treasurer.

it was found that the appropriation of the bequest by the act organizing the establishment in 1846, related only to that part of the bequest which had already been received, and made no provision for the disposition of the residuary legacy which has just become available. It can scarcely be doubted, however, but that Congress intended to appropriate the whole of the bequest to the maintenance of the establishment; still, for this purpose, a special act will be required, and it is desirable that the sum recently received be deposited in the treasury on the same condition with the amount originally obtained, that the interest alone shall be subject to expenditure. In this connexion it is proper to remark that Mr. Peabody, who received the deposit of the fund, so far from claiming the usual commission, allowed four per cent. on the money while it remained in his hands.

It will be seen from what follows in this report that all parts of the programme have been prosecuted during the past year with as much energy as the means at our disposal would permit, and that although, in some particulars, not as much has been accomplished as in previous years, the inequality will, it is hoped, be attributed, as it is properly referable, to the difficulties under which the Institution, in common with the whole country, has been laboring.

Publications.—The whole number of pages issued during the year amount to 872 quarto and 1,657 octavo.

The thirteenth volume of the Contributions has been distributed to public libraries, and the fourteenth is nearly completed, and will be published in the course of a few months. It will consist of the following papers:

1. The third and fourth series or concluding parts of the discussion of the magnetic and meteorological observations, made at the Girard College observatory, Philadelphia, by Professor A. D. Bache, Superintendent of the United States Coast Survey.

2. On the construction of a silvered glass telescope, 15½ inches in aperture, and its use in celestial photography, by Dr. Henry Draper, of the University of New York.

3. A memoir on the palæontology of the Upper Missouri, by F. B. Meek and F. V. Hayden.—Part 1.

4. A memoir on the cretaceous reptiles of the United States, by Dr. Joseph Leidy, of the University of Pennsylvania.

It was intended that Dr. Dean's paper on the medulla oblongata, described in the last report, and partially distributed in separate num-

bers during the year, should form a part of this volume ; unfortunately, however, the plates intended for its illustration were destroyed in the fire, and its place in the volume has been supplied by the fourth article, which has since been presented for publication.

In the reports for the last three years an account has been given of a series of papers containing the deductions from the magnetic observations at Girard College, Philadelphia, by Professor A. D. Bache, Superintendent United States Coast Survey. The whole of this series of papers was divided into four sections, each containing three parts. The object of the whole series is to present the results deduced from the changes observed in the direction and intensity of the magnetic force of the earth as apparently affected by the position of the sun and moon relative to the earth and to each other.

The first section related to the disturbances in the line of the declination, or of the fitful variation, as it is called, of the magnetic needle, and to the regular variations of the declination.

The second section related to the variation in the intensity of the magnetic force of the earth, estimated in a horizontal direction.

The third section related to the same force as estimated in a vertical direction.

The fourth section relates to the perturbations or fitful changes in the direction and intensity of the total magnetic force of the earth as estimated in the direction of the dipping needle.

The first three of these sections have been described in previous reports, and it now only remains to give an account of the fourth and last.

The data for the deductions given in this section are the quantities observed in the variations of the horizontal and vertical components of the magnetic force, expressed in minute scale divisions corrected for progressive changes in the magnetism of the bars and for changes due to temperature. The object of the investigation was to determine the law of the great disturbances to which the total intensity and direction of the magnetic force of the earth is subjected. It is well known that the intensity and direction of the magnetic force of the earth do not remain the same from hour to hour, but are subject to regular fluctuations connected with the day and the season, and also to larger perturbations, which have until lately been considered fitful, and have therefore received the name of magnetic storms. The special object of investigation of the first part of the fourth series is to ascertain the average character of the large disturbances, and to

deduce, if possible, the law by which they are governed. This is the most intricate part of the whole series, and is the final object to which the preceding investigations were preparatory. From a careful study of all the observations on the dip, it was found that 1,446 might be considered as giving abnormal values, and of the total force of the earth's magnetism 1,470 indicated abnormal changes, which amounted to about one-fifteenth part of the whole number of observations. These abnormal disturbances were analyzed in relation to their frequency during the hours of the day, the month of the year, and successive years ; they were also studied as to their tendency to exhibit an increase or diminution in their variations and the times of the greatest and least action in relation to the periods above mentioned. This part ends with a table of the relative magnitude of the disturbances and a comparison of those of Toronto and Philadelphia, from which it appears that in some cases there is an agreement in the character of the simultaneous changes in the two places, and at others not.

The second part of the fourth section treats of the solar diurnal and annual inequality of the dip and total force, that is, of the changes due to the sun which take place in the dip and total force from hour to hour and from month to month. In this investigation all the greater perturbations are omitted and the laws of the simpler or more normal changes are sought. The diurnal changes in the dip are shown analytically and graphically for each month and for the whole year. The general character of the curve exhibits a maximum at about 11 a. m. and a minimum at about 5 a. m., with a range of one minute and two-tenths—a quantity too minute to be recognized by the ordinary dip circle, and which can only be observed by the differential reflecting instrument. In summer the epochs occur earlier, with a range of a minute and a half, while in winter they occur later, with a range of only one minute. There is also a secondary fluctuation of small magnitude. The diurnal deviation of the dip is greatest about the time of the equinoxes, and of these maxima that of the winter is the least. The diurnal changes in the total force as deduced from the average of the year are represented by a single crested curve, but from the average of the observations in winter alone this assumes the form of a double curve. The principal maximum as deduced from the whole year coincides with the hour of 2 p. m., and in winter occurs about an hour and a half earlier. The principal minimum coincides with 10 p. m., and occurs in winter about two hours earlier. This part ends with an attempt to deduce from the data the annual changes in dip and intensity. The result, how-

ever, is not entirely satisfactory on account of the large disturbances due to variations of temperature, changes of the magnetism and adjustment of the instrument.

The third part of the fourth section, or the twelfth part of the entire series, contains the result of the observations made with a portable dip circle constructed by Robinson, of London, the same which had been previously used by Professor Bache in his magnetic observations in Pennsylvania and adjacent States, and also in Europe. The observations were made weekly during a period of nearly two and a half years; the monthly and annual mean observations of the dip were tabulated and were found to indicate an annual decrease of one minute and two-tenths in this element. The same paper contains a collection of observations on the dip at different points in Philadelphia by different observers, from which a similar change in the dip has been deduced. The least dip occurred in January, 1840, and increased for several years after that date. It is probable, however, from some subsequent investigations by Mr. Schott of observations at other places, that the minimum obtained at Philadelphia, above mentioned, was of a secondary character, and that a still smaller dip will hereafter be observed. But this point will be cleared up in a few years by observations now in process of collection. The discussion of this part, and indeed the whole of the series, ends with a table of magnetic constants for Girard College, namely: of the declination, or variation, as it is sometimes called; of the dip; of the horizontal, vertical, and total force, all expressed in absolute measures, for five different epochs and for one mean epoch, that for January, 1843, for which the declination is 3° 32′ W., the dip 71° 59′ N., the horizontal force 4.173, the vertical force 12.83, and the total force 13.49, in units of one foot, one grain, and one second of mean time.

From all the investigations on this subject up to the present time we may infer, first, that the earth is a great magnet, having a natural, and in one sense a permanent, polarity; second, that this polarity is disturbed in intensity and direction by the varying effect of the heat of the sun; third, that the magnetism of the earth is affected by that of the sun and moon; and fourth, it is probable that magnetic polarity is common to all the bodies of the solar system.

The second paper in the thirteenth volume of the Contributions—that on the silvered glass telescope—is fully described in an article at the end of this report, copied from the "Intellectual Observer," of London.

The third paper in the volume, on the palæontology of the Upper Missouri, was described in the last report. It occupies 158 pages, and is illustrated by five plates of figures engraved on stone.

A full account of the fourth paper, on the cretaceous reptiles of the United States, as given by the author, is also appended at the close of this report.

Miscellaneous Collections.—On account of the continued increase in the price of printing and paper, and the unexpected length to which some of the works were tending, I thought it advisable to suspend, for the present, the general publication of this series. Of the list of works it comprised, as given in previous reports, the only ones published since the last session of the Board are the second part of Binney's Bibliography of American Conchology, Meek's Check Lists of Fossils, and the supplement to Loew's Diptera.

The first of these contains an account of the writings of foreign naturalists relative to American conchology, and also additions and corrections of the first volume, with a copious index of authors and names of species. It forms an octavo volume of 300 pages.

The second work consists of check lists of all the species of cretaceous, jurassic, and miocene invertebrate fossils of North America which had been described up to the end of 1863. These constitute an important aid in the labor of cataloguing and labelling collections. The manuscript of another number of the same series, prepared by Mr. Conrad, of Philadelphia, has been received. It gives a list of the eocene invertebrate fossils, and, as the work is much wanted to assist in the distribution of specimens, it will be put to press immediately.

The other article of the Miscellaneous Collections published during the past year is the supplement and completion of the second part of the monograph of the Diptera of North America, by H. Loew. A general account of the work on the diptera (comprising flies, musquitoes, &c.) is given in the report for 1861. This order of insects has perhaps a wider distribution than any other known, and, from the variety and the minuteness of the specimens, is difficult of study and classification. Before attempting to give a monograph of the whole order, it was thought proper to print a catalogue of all the genera which had been described, and this work (prepared by Baron Osten Sacken) was published in 1858. The preparation of the monograph was intrusted to Dr. H. Loew, of Meseritz, Prussia, one of the most eminent naturalists in this line now living.

In the first part of this work is an essay on the terminology of

diptera, a sketch of the systematic arrangement of the order, with the genera found in North America. It occupies 221 pages, and is illustrated by two plates. The second part is occupied with a monograph of the American Dolichopodidæ. For a large portion of the materials on which both parts of this work are based the Institution is indebted to the liberal assistance of Baron Osten Sacken, though some interesting species were communicated to Mr. Loew by Mr. Le Baron, of Illinois, and by Professor Macklin, of Helsingfors, collected by Mr. Sahlberg. The types of a collection were also lent to him by the directors of the *Hof Naturalien Kabinet*, of Vienna.

Although the materials placed at the disposal of the author were large, they did not reach the extent desired for the preparation of a complete monograph. The hope is, therefore, expressed that additional collections will be made to complete the work, and for this purpose the request is earnestly urged on all North American collectors who take an interest in this order of insects, to favor the enterprise by sending specimens to the Institution, which may be transmitted to Dr. Loew.

The fauna of North American Dolichopodidæ far exceeds the European in the variety of forms and in the number of species. A striking circumstance connected with this class of insects as found in North America is their remarkable analogy to the remains of the fossil fauna of the same family preserved in amber. In both there is the same abundance of species of a particular genus, difficult to distinguish on account of their close resemblance. It would appear from this, that if there is a gradual variation of species under varying conditions of existence, this variation has been less in regard to American insects of this class than in those of Europe. It is important in the progress of science not only to trace the limits of different faunas, but to compare those of a similar class in different countries. At present, however, this cannot be done with any degree of precision, except in the case of the American and European insect fauna. In this case it is distinctly perceived that the two approach each other in the species of several genera, while in others the species are identical, and again those which are identical in both are very unequally represented in the two countries. Of the species common to Europe and North America, it is not improbable that some of them should have been accidentally imported in ships from the former.

The second part, including the supplement, consists of 371 pages, and is illustrated by five plates.

Two other works of the same series were completed, and would have been immediately published had the manuscripts not been destroyed by the fire. The first of these was a monograph of the Myriapoda, by Dr. H. C. Wood, and the other a monograph on the Limnobina, by Baron Osten Sacken.

Reports.—The annual reports to Congress are printed at the expense of the government as public documents, with the exception of the wood-cuts, which are furnished by the Institution; and it is gratifying to be able to state that for a number of years there has not been a dissenting vote in Congress on the adoption of the order to print the usual number of ten thousand extra copies of this work. The manuscript of the report for 1863 was unfortunately mislaid at the Capitol, and the public printer was therefore obliged to delay the publication on account of other more pressing demands of the departments of the government. It is much to be regretted that at the recent fire at the Institution all the copies of the reports on hand for general distribution to individuals were destroyed, so that at present it will be impossible to supply the many applications which are made for copies of the back volumes of the series. The reports for 1861 and 1862 were stereotyped, and when the cost of press-work and paper is reduced to its normal state, a new edition of these may be struck off and disposed of at the mere price of production.

The report for 1863 contains in the appendix a course of lectures on the principles of linguistic science, by Professor W. D. Whitney, of Yale College; a eulogy of Beautemps-Beaupre, translated by C. A. Alexander, esq., a continuation of the series of memoirs of distinguished members of the French Academy of Sciences; an account of the origin and history of the Royal Society of London, prepared by the same; an exposition of the modern theory of chemical types, by Dr. Charles M. Wetherill; an original article on the method of preserving Lepidoptera, with illustrations, by Titian R. Peale, esq.; an account of a remarkable accumulation of bats at the residence, in Maryland, of M. Figaniere, Portuguese minister; a number of articles on ethnology, giving an account of ancient remains in various parts of America and Europe There are also a number of translations made expressly for the Institution, viz: researches on the phenomena which accompanied the propagation of electricity in highly rarefied elastic fluids, by Professor de la Rive; report on the proceedings of the Society of Physics and Natural History of Geneva, by Professor Marcet; the commencement of Plateau's researches on the figures of

equilibrium of a liquid mass withdrawn from the action of gravity; an account of the history of discovery relative to magnetism; recent researches relative to the nebulæ, by Professor Gautier; an article from the annals of the Observatory at Madrid, by Miguel Merino, on the investigations made to determine the form and volume of the earth; Arago's account of aeronautic voyages performed with a view to the advancement of science, to which is added from an English publication Mr. Glaisher's account of his recent ascensions in England; the first part of an interesting and valuable account of the aboriginal inhabitants of the Californian peninsula, by Baegert, a Jesuit missionary who lived there seventeen years during the second half of the last century; and an article from a German scientific periodical on purple and azure dyeing in ancient and modern times. At the end of the volume a few of the more important tables of weights and measures, especially needed for reference in some of the preceding articles, have been added.

Ethnology.—The publications of the Institution relative to ethnology during the past year are those given in the appendix to the last report, the most important of which is a translation by Professor Rau, of an account of the aboriginal inhabitants of the Californian peninsula, by Baegert, a German Jesuit missionary. The book from which this translation was made was published in Germany in 1773, and is now very scarce and almost unknown in this country. It will be considered, we doubt not, at this time, an interesting contribution to the ethnology as well as the early history of a part of the world which has of late years occupied so much of the public attention. Mr. Rau has not given a translation in the strict sense of the word, but a reproduction of the work only so far as it relates to ethnological matters, his object being to rescue from oblivion facts relating to the history of a portion of the American race. The second part of this work will be published in the appendix to the present report.

There is a growing taste for the study of ethnology in this country, and consequently a desire to form collections illustrating the condition of the American aborigines in different parts of the continent. In order to encourage this tendency, and to bring together for critical study and comparison the scattered specimens which exist in this country, the Institution has requested, either as a gift or a loan, specimens of the arts and other remains found in mounds, excavations, or on the surface of the ground; and with the assistance of Professor Matile, formerly of the University of Neufchatel, commenced in 1863

the preparation of a series of moulds from which casts are made for distribution and exchange. In carrying on this work we have been favored with a large collection of specimens of Mexican art, principally images and masks, by the American Philosophical Society, of Philadelphia, from which moulds have been taken. The prosecution of this work has been temporarily suspended, but will be resumed as soon as facilities and means for its prosecution can be provided. In this connexion we would renew the request which we have made in previous reports, that descriptions of all mounds or aboriginal earthworks which may be discovered may be sent to the Institution for the purpose of furnishing the materials for a work at some future time on the distribution and migration of the ancient inhabitants of this continent. In order to preserve and render generally accessible the information which may be obtained in this way, it will be published in the appendix to the next succeeding annual report after its reception.

Meteorology.—It has been mentioned in previous reports that the second volume of the results of meteorological observations made under the direction of the Smithsonian Institution and the Patent Office, from the year 1854 to 1859, was in press, and that its completion was delayed by the unusual amount of printing required by the necessities of the public service to be executed at the Government Printing Office. It was thought best, therefore, to issue the portion already printed, without waiting longer for the other material which it had been intended to embrace in the volume. This portion, forming a quarto volume of more than five hundred pages, was consequently bound and distributed during the past year. It is divided into two parts, each occupying about half the volume. The first relates to the periodical phenomena of plants and animals from 1851 to 1859, inclusive, embracing observations upon the foliation of eighty-seven species, the blossoming of ninety-two, the ripening of fruit of ten, and the defoliation of eighteen species of plants, and upon the first appearance of sixteen species of birds, one of reptiles, three of fishes, and two of insects. These results have a direct application to meteorological science, by indicating the progress of the seasons in different localities, and their relative variability in different years. To these have been added several tables of the opening and closing of lakes, rivers, canals, and harbors, collected from various sources, and tending to illustrate the same leading features of climate as the records of organic phenomena. The materials were furnished chiefly by the regular Smithsonian observers, and were arranged and prepared for publication by Dr. Franklin B. Hough, of Albany, N. Y.

The latter half of the volume is occupied with materials for the critical study of three storms in 1859, one of which occurred in March, and the other two in September, collected from the records of the Institution, and prepared for publication by Professor J. H. Coffin, of Lafayette College, Easton, Pennsylvania. One of the important objects aimed at in establishing the meteorological observations of the Smithsonian Institution was the collection of data for the critical examination of the development and progress of the extended commotions of the atmosphere which occur during the autumn, winter, and spring, over the middle or temperate portions of North America. It is well known that two hypotheses as to the direction and progress of the wind in these storms have been advocated with an exhibition of feeling unusual in the discussion of a problem of a purely scientific character, and which, with sufficient available data, is readily susceptible of a definite solution. According to one hypothesis the motion of the air in these storms is gyratory; according to the other it is in right lines toward a central point, or toward an irregular elongated middle space. It is hoped that the data here given will be considered of importance in settling, at least approximately, these questions as to the general phenomena of American storms.

These two quarto volumes of meteorological results for the six years 1854 to 1859 inclusive, embracing nearly two thousand pages, together with a volume covering very nearly the same period of time published by the War Department, probably form an unsurpassed body of materials for the investigation of meteorological phenomena over so wide an extent of country. The tables of the War Department embrace nearly two hundred quarto pages of reductions for five years, 1855 to 1859, inclusive, and form an appendix to the "statistical report on the sickness and mortality in the army of the United States," published in 1860, compiled by Assistant Surgeon R. H. Coolidge, under the direction of Dr. Lawson, Surgeon General United States army. The original records, both in the Smithsonian Institution and War Department, from which the results contained in these three volumes were deduced, are open to the examination of persons who wish to make investigations more minute, or of a more extended nature than can be embraced in general tables.

It is regretted that we have not the means at present of continuing the reduction of all the records as received from the observers, and of publishing the results. This want, however, is supplied to a limited extent by the publication of the reductions of temperature and

rain in the monthly report on the state of the crops and the weather, issued by the Agricultural Department, between which and this Institution the relations mentioned in the last report have been maintained through the past year. To save postage, the blank forms have been sent out and the registers returned through the frank of the office of the Commissioner of Agriculture. The monthly bulletin above referred to, which is printed at the expense of the same department, continues to be received by the public with much favor; and, by means of its extensive distribution, presents the meteorological tables to a much larger circle of readers than is comprised in the list of our observers, awakening, to a corresponding extent, an interest in the subject of meteorology. This branch of science is receiving increased attention from year to year, and a larger number of individuals are devoting time and talent to efforts for unfolding the laws which control the formation and movement of vapor, winds, and change of temperature in all parts of the world. Meteorology has ceased to be a mere record of isolated facts. The special characteristic of modern efforts in this line consists in extended cooperation, and in determining the simultaneous condition of the atmosphere over extended regions of country. It is only by this means that the laws which govern the occurrence, motion, direction, and propagation of the disturbances of the atmosphere can be ascertained. By comparisons of this kind isolated observations of otherwise little value become important, and afford an ample field in the cultivation of which any person who will take the trouble to record the direction of the wind, the beginning and ending of rain, snow, hail, the time of blossoming of trees, appearance of birds, insects, &c., may render valuable service.

The daily record of meteorological observations telegraphed to the Imperial Observatory at Paris, and published in a lithographed sheet, continues to increase in interest and importance under the active and enlightened superintendence of M. Le Verrier, director of the observatory. From being the medium simply for the circulation of telegraphic notices of the weather, it has become, in addition, a repository of valuable meteorological summaries, communications, criticisms, and announcements. The outline chart of Europe, with the curves of equal barometric pressure and direction of the wind at the different stations on the day of publication, and also a table of the estimated weather for the following day, continue to be inserted in every number. The title of the publication is now "International Bulletin of the Imperial Observatory of Paris." It occupies more than

twelve hundred folio pages yearly, at a subscription price of thirty-six francs.

The Institution has also received a similar meteorological bulletin from the Royal Observatory at Palermo. In the first number of this, a plan is proposed for distributing simultaneous meteorological observations similar to that which was adopted previous to the war by the Smithsonian Institution, viz: that of furnishing the most important telegraphic stations with meteorological instruments, and instructing the principal telegraphist, or one of his assistants, in the process of making observations. A thoroughly organized system of this kind over the whole United States, with a series of directions for predicting the weather at a given place from a knowledge of the condition of the atmosphere at distant points, would be of vast importance to the maritime and agricultural interests, particularly along the Atlantic sea-board. It is hoped that as soon as order is restored and peace fully re-established throughout the southern portion of the United States, the system will be revived under still more favorable auspices.

An important addition to the means at the command of the Institution for this purpose has been furnished by the liberal action of the North American Telegraphic Association, in giving the free use of all its lines for the scientific objects of the Institution. The association embraces the Western Union, the American, the Montreal, the Southwestern, and the Illinois and Mississippi Telegraph Companies, covering the entire United States and Canada, including the overland line to San Francisco, which, by its charter, is required to transmit without charge scientific despatches for the Institution. The telegraph companies on the Pacific coast have also liberally granted the same privileges.

I am happy to state in this connexion that efforts have been made to revive and complete the meteorological observations which were collected by the Naval or National Observatory. The records from the log-books of the commercial and naval marine collected under the direction of the former superintendent, though imperfectly, and in many cases erroneously interpreted, were valuable contributions to the materials from which the true theory of the general motions of the atmosphere are to be deduced.

The lake system of meteorology is still kept up under the new superintendent, Col. Raynolds, though the Institution has not received the copies of the registers for the past year.

The State Department has furnished the Institution with several meteorological contributions forwarded to it by consuls in foreign

countries. Among them are observations made at Constantinople for the year ending September, 1863; daily telegraphic reports of the weather in Europe, communicated to the Central Physical Observatory at St. Petersburg, Russia, for the year ending September, 1864, translated and compiled by Mr. Edwin Phelps, United States consul; meteorological review for the year 1864, from observations at the Leprosy hospital of Lungeguard in the city of Bergen, Norway, reduced by O. E. Dreutzer, United States consul; monthly tables for a part of the year 1864, from the consul at Turk's Island, West Indies. If all the American consuls in foreign countries would collect and send to the State Department local publications containing meteorological tables, many valuable additions might be furnished.

The Navy Department, as heretofore, has transmitted to the Institution monthly reports kept at the naval hospitals at Chelsea, New York, and Philadelphia.

A circular and a chart of stars prepared by the Connecticut Academy of Arts and Sciences was published by the Smithsonian Institution, and distributed to its observers for the purpose of obtaining records of the meteors that might appear on the night of November 13–14, 1864, but the general cloudiness of the night prevented the attainment of any valuable results.

The three rooms in which the meteorological records were kept were destroyed by the fire on the 24th of January, 1865. Owing to the great rapidity with which the fire progressed much valuable material was lost, but fortunately the larger portion of the contents of the rooms were saved. Among the articles lost were the principal instruments used at the Institution for meteorological observations, including the self-registering apparatus for recording the direction and velocity of the wind, constructed by Dr. Smallwood, of Montreal, and partially described in the Smithsonian reports for 1856 and 1860. It had been in operation since 1858. All the records kept by it were lost. As soon as a minute investigation can be made as to the missing sheets of the general records, a list of deficiencies will be published, and it is hoped that a portion at least of these may be restored by copies of the duplicates retained by the observers.

Laboratory.—During the past year the laboratory has been in charge of Dr. Charles M. Wetherill. The experiments mentioned in the last report on materials for light-house illumination have been continued, and a series of examinations has been made of different substances submitted for that purpose by the government. The most

extended series of experiments, however, has been that which relates to the condition of the air, and the mode of ventilation of the United States Capitol. This subject was referred by Mr. Thomas U. Walter, the architect of the Capitol, to the Secretary of this Institution. The plan of the investigation having been determined, the experiments have principally been made by Dr. Wetherill. The result of this investigation, it is believed, will not only throw additional light on the points for which it was instituted, but also form an interesting addition to the subject of ventilation. The work in the laboratory, also by Dr. Wetherill, comprised various researches upon subjects of chemical science. Of these, three, viz.: "On the nature of the so-called ammonium amalgam;" "On the crystallization of sulphur;" and "On the crystalline nature of glass," will be published shortly in one of the scientific journals of the country. The means for carrying on physical research at the Institution have been materially diminished, on account of the destruction by fire of the very valuable collection of physical apparatus. Fortunately the conflagration did not extend to the laboratory, and consequently the chemical apparatus was preserved.

Collections of specimens of natural history, &c.—The work of making collections of specimens of natural history has been prosecuted as in previous years. A very large collection of mammals, birds, eggs, &c., made in the northern part of British America in 1863, principally by the officers of the Hudson's Bay Company, has arrived at Fort Garry, and is expected soon to be received in Washington. Collections have also been received from Labrador, Puget's sound, and from various parts of the United States, Central America, Mexico, and the West Indies, a detailed account of which is given in the annexed report of Professor Baird. Advantage has been taken of every exploring expedition which has been sent out by government, and in many cases of the assistance offered by officers of the army, particularly of the medical department, for adding new materials or duplicate specimens to the collections. The great object, as has been frequently stated before, of this work, is to obtain the materials for an extended knowledge of the natural history of this continent, and to furnish illustrations of type specimens to museums, colleges, and other educational establishments.

The whole number of specimens catalogued during the last twelve years is upwards of 100,000, and including duplicates, the whole number collected will amount to five times that amount.

The distribution of duplicates has been continued as rapidly as the identification and labelling could be accomplished. In this distribution regard has been had to the relative geographical positions of the establishments to which the first sets of specimens have been sent as well as to their importance as influential centres of higher education. According to the statement of Professor Baird, it will be seen that already upwards of 16,000 specimens have been distributed during the year, and efforts will be made during the season to increase this number. The importance of this branch of operations depends more upon what the Institution is enabled to distribute than on what it accumulates for permanent preservation.

Museum.—The type specimens of the museum have been gradually increased during the past year, not only from the collections made by the Institution, but also from donations received from abroad, particularly as regards rare birds, eggs, fossils, and animals. The European specimens of ornithology were requested for the purpose of enabling Professor Baird by comparison to prosecute his work on American birds.

Previous to the fire the large room partly occupied by the Stanley collection of Indian portraits had been fitted up with about two hundred feet of cases around the walls, to receive the ethnological specimens in possession of the Institution. While engaged in re-arranging the pictures above these cases, the workmen, with a view to their own comfort, unfortunately placed the pipe of a stove in a ventilating flue which opened under the roof, and thus caused the conflagration which destroyed the upper part of the main building. Fortunately none of the ethnological articles had been placed in this room, and consequently these specimens, with those of the museum and of the general collections, have been preserved.

Exchanges.—The system of international literary and scientific exchanges has been continued during the past year with unabated energy, and on the part of the Institution exclusively, several hundred sets of its publications, each embracing 1,782 pages, have been sent to foreign institutions.

According to the tabular statement given by Professor Baird it appears that, during the year 1864, there have been despatched to foreign countries 1,011 packages, each containing a number of articles, enclosed in sixty-three boxes, measuring 546 cubic feet and weighing 20,500 pounds. The number of packages received in return for societies and individuals in this country was 2,482 (nearly twice as many as in 1863) exclusive of those for the Smithsonian library.

Library.—The library has continued to increase, principally by the addition of all the current transactions of societies and of scientific journals. By exchanges there have been received 645 octavo, 153 quarto, and 25 folio volumes, 2,754 pamphlets and parts of volumes, and 109 maps and charts—total 3,686. In the appendix to this report will be found a list of the foreign societies and individuals which have made donations to the library of the Institution, with the number of works received from 1860 to 1864.

Lectures.—Up to the occurrence of the fire no lectures had been given this season; indeed, on account of the increased expenditures incident to the advance of prices, it was thought advisable to diminish the number of lectures, since this part of the operations of the establishment has not been considered of so much importance as other sections of the general plan of organization. It can scarcely be doubted that the publication in the late annual reports of synopses of the lectures has been of more service in the diffusion of knowledge than their delivery in the hall of the Institution, and that their place may, with equal advantage, be supplied by occasional and popular expositions of certain subjects in a similar form.

The foregoing is the substance of what was intended for presentation to the Board of Regents as an exposition of the state of the Institution at the close of 1864, and of what had been accomplished during that year in the way of carrying out the programme of organization. On account of the burning of the original draft of the report, and of a large portion of the records of the establishment, the statements are not as full in some particulars as they would have been had they been prepared under more favorable circumstances, but the deficiencies in this respect can be made up in the report for next year.

The danger from fire at the Institution has been to me, from the commencement of the occupancy of the building, a source of constant and anxious solicitude. The combustible character of the two wings, of the two connecting ranges, and of the interior of the towers, together with the plan of heating originally adopted, rendered an accident by fire far from improbable, and led me to enforce a system of vigilance, the strict observance of which I hoped would insure safety. The flame, however, was communicated at a point where danger was least suspected, and through one of those contingencies against which all circumspection is unavailing.

But, although greatly to be regretted on account of the losses incurred, the accident is not without compensation in considerations of a different nature; thus, it has served to call forth the expression of a large amount of kind feeling in regard to the Institution, to direct the attention of Congress to the character and importance of its operations, and has thus, perhaps, furnished the opportunity of remedying some of the defects in the original law of its organization, which were the result of the novelty of the enterprise or the desire of reconciling inconsistent propositions. Immediately after the fire, as is well known to the Board, a committee of the two houses of Congress was appointed to inquire into its origin, the loss sustained, the means necessary to repair the building, and to collect such facts in connexion with the whole subject as might be of public interest. This committee, after adopting the report of the special committee of the Board* as to the origin of the fire, called upon the Secretary for a detailed statement of the origin and objects of the Institution and of its operations from the beginning, in connexion with the policy of the Regents and his own superintendence of its affairs.

In pursuance of this request I submitted to the committee a general review of the more prominent facts connected with the adoption of the plan of organization, and of what has been since accomplished towards realizing the views of the founder and the wishes of the friends of the Institution. Although this review may give facts familiar to some of the members of the Board and to those who have directed any special attention to the history of the establishment, it may well be inferred from occasional remarks, not only in the journals of the day, but on the floor of Congress, that there is no little need of the repetition of statements tending to correct misconceptions which arise, no doubt, much oftener from inattention than from prejudice. It is for this reason, and to keep before the public mind distinct ideas of the character and operations of the Institution, that I append, as the concluding portion of this report, the statement, somewhat expanded in the introduction, which I had the honor of laying before the Joint Committee of Congress.

SKETCH OF THE ORGANIZATION AND OPERATION OF THE INSTITUTION.

The founder of this Institution, James Smithson, was a graduate of the University of Oxford, devoted during a long life to the advancement of science, and the author of a number of original contributions to geology, chemistry, mineralogy, &c. He was well acquainted with

* See proceedings of the Board.

original research in the various branches of knowledge, and had doubtless a proper appreciation of the good which might be effected by founding an institution especially adapted to advance this object. He accordingly intrusted his property to the United States to found an establishment "*under the name of the Smithsonian Institution for the increase and diffusion of knowledge among men.*" He evidently did not intend by these precise terms to found a library or a mere museum for the diffusion of popular information to a limited community, but a cosmopolitan establishment, to *increase* the *sum* of human knowledge and to diffuse this to every part of the civilized world. No other interpretation of the will is either in accordance with the terms employed or with the character and habits of the founder. The *increase* of human knowledge, by which we must understand additions to its sum, would be of but little value without its diffusion, and to limit the latter to one city, or even to one country, would be an invidious restriction of the term *men*. These views, so evident to minds especially devoted to science, were not at once apparent to those whose studies and pursuits had been chiefly confined to literature or public affairs. The first scheme which was presented in regard to the character of the future institution proposed that it should assume the form of a university, but this idea was shown to be erroneous by the Hon. J. Q. Adams, who pointed out the fact that the object of a university was not to increase knowledge, but to diffuse that which already exists. The next proposition, which had many advocates, was that of a large library or museum; but these objects are in a measure local in their influence and tend, like the former, to promote rather the diffusion than the increase of knowledge.

From this diversity of opinion as to the character of the proposed Institution, or from whatever other causes, the bequest was suffered to remain inoperative for eight years. It was not until 1846 that Congress passed the act of organization under which the Institution has since continued in operation.

This act directs that provision be made for a library, museum, and gallery of art, in a suitable building of plain and durable materials, and after these and some other general indications of the views of the legislature, leaves it discretionary with the Board of Regents to adopt such further measures for promoting the common purpose as might seem, in their judgment, best to comport with the terms of the donation.

I may be permitted to state, without giving undue prominence to my own part in the organization, that immediately after the passage

of this act I was requested by one of the Regents to prepare a sketch of such an institution as I deemed that of Smithson ought to be, with reference at once to the requirements of Congress, and the brief, though comprehensive, phrases of the will. After devoting careful attention to the expressions of the bequest, and being acquainted with the character of the founder, I could not entertain the slightest doubt that it was the intention of the latter to establish a cosmopolitan institution, which should be alike a monument of his own fervent love of science, an efficient instrumentality for promoting original researches and rendering a knowledge of their results accessible to inquiring minds in every part and age of the world. I accordingly advised the adoption of the plan set forth in the first section of the programme presented to the board in my report for 1847,* a plan which is principally designed to increase knowledge by instituting researches and assisting in various ways men of talents and acquirements to make original investigations in all departments of scientific inquiry, as well as to diffuse the knowledge thus obtained by presenting, free of cost, to all the principal libraries and public institutions of the world copies of a series of volumes containing the results of the investigations instituted.

Previous to the presentation of these views, one of the Regents had reported in favor of making immediate provision for a library, a museum, a gallery of art, and other local objects, in connexion with a system of lectures to be delivered in different parts of the country; while another Regent had presented an eloquent appeal in favor of a great library composed of books in all languages and on all subjects.

In reviewing these and other plans of organization which had been previously advocated, it will scarcely be denied by an unprejudiced mind that, for the most part, they were such as to exert a merely local influence, and which, if they embraced means for the diffusion of popular knowldge, neglected the first and essential condition of the bequest, viz.: the *increase* of knowledge—in other words, the advancement of science or the discovery and promulgation of new truths. On the other hand, the plan of organization presented in the first section of the report for 1847 is that of a living, active, progressive system, limited in its operations only by the amount of the income; calculated to affect the condition of man wherever literature and science are cultivated, while it tends in this country to give an impulse to original thought, which, amidst the strife of politics and the inordinate pursuit of wealth, is, of all things, most desirable.

* See programme of organization, page 8 of this report.

These views, which have commanded the approval of unprejudiced and reflecting persons generally, and especially of men of science, to which class Smithson belonged, were fully shared from the first by Professor Bache, General Totten, Gideon Hawley, esq., and in whole or in part by other members of the board, and I was elected the secretary or principal executive officer, to develop and carry into practice, as I supposed, under the direction of the board, the plan I had suggested.

The appointment was accepted with much and not causeless solicitude as to the result. I soon found that although a number of the members of the board were in favor of the promotion of original researches, or of what has since, by way of discrimination, been called the active operations, neither a majority of the Regents nor perhaps the community in general was prepared to favor a plan of organization which should exclude the material representation of the Institution in the form of an extensive architectural structure calculated to arrest the eye and embellish the national capital.

It was in vain to urge the fact that a large and expensive building was not only unnecessary to the realization of the purpose of Smithson, but that it would tend to defeat that object by absorbing the income, controlling the future policy of the Institution, and confining its influence principally to a single locality; that it was not the estimated first cost of the edifice which should alone be considered, but also the expense of keeping it in repair and the maintenance of the corps of assistants and employés which would be required in an establishment of this kind; that the increase of the collections of a miscellaneous library and public museum would, in time, require additional space; and that, finally, all the revenue of the bequest would be absorbed in a statical establishment, or in attempting to do that which can only be properly accomplished, as in other countries, by means of the government. Unfortunately the building committee had settled upon a design for the building in the Lombard style, and Congress had presented to the Institution the museum of the exploring expedition, then at the Patent Office, and directed that provision should be made on a liberal scale for its accommodation, neglecting, at the same time, to fill the blank in the act of organization, by which the cost of the building was to have been limited. It was this provision of the law which furnished a fulcrum for the influence exerted by the citizens of Washington, and persons pecuniarily interested, directly or indirectly, in contracts or otherwise, in favor of the erection of the present structure. Thus

re-enforced, the fascination of its architectural display as presented on paper proved too strong to be resisted.

The adoption of this extensive and costly building was considered so inauspicious a beginning that I had resolved to resign the office of director, and make no further attempt to introduce the plan with a view to the success of which I had accepted the position, when a temporary compromise was proposed by which the several plans might be brought to the test of experience, and an opportunity apparently given for any modifications which might be found advisable.

In order to meet the large expenditure on the building, to provide for the support of the establishment necessarily connected with it, and to leave the greater part of the interest of the original bequest free to be applied to its more legitimate objects, it was resolved to create an extra fund, while gradually developing the plans of organization, and for this purpose the following course was adopted:

1. The building to be erected in parts, and its different portions gradually brought into requisition, its completion being thus delayed for a number of years.

2. The sum appropriated to the building, furniture, and grounds, viz., $250,000, being mainly the interest which had accrued previous to the organization, to be invested in United States treasury stock, bearing interest.

3. The plan of organization to be gradually developed, and, instead of expending upon it from the first the whole interest of the original bequest, a part of this to be also invested in treasury bonds.

4. The remainder of the income to be divided between the active operations on the one hand and the library and museum on the other. The latter to be restricted principally to scientific books and to type specimens.

This compromise was adopted, and has been so successfully and steadily carried out financially, that at the commencement of the war, after paying for the building, accumulating a very valuable library, establishing and supporting a large museum, and carrying on all the active operations of the establishment, an extra fund had been created amounting to $140,000. In order to secure this from the contingencies of any future expenditure on buildings or loss from hazardous investment, a petition was preferred to Congress to take it from the care of the Regents and deposit it with the original principal in the treasury of the United States, subject to the same restriction, viz., that the interest alone could be expended. This petition not having been acted upon, the Regents

deemed it expedient to invest the money in such State stocks as were then considered most eligible, and accordingly there were invested in—

Indiana	5 per cent. stock	$75,000
Virginia	6 " " "	53,500
Tennessee	6 " " "	12,000
Georgia	6 " " "	500
Washington	6 " " "	100
Amounting in all to		141,100

This scheme has afforded an ample opportunity to compare the relative advantages of the two principal plans of organization and to verify the predictions which were originally made in regard to the building. Though but a portion of the income has been devoted to the active operations, they have produced results in the way of increasing and diffusing knowledge abundantly sufficient to justify the anticipations which were entertained in regard to them, and to convince the most skeptical of their primary importance. As to the building, it is now abundantly proved that a structure of one-fifth of the cost would have been sufficient for the wants of the Institution, and that two grave errors were committed in the adoption of the present one: first, the plan was but little adapted to the uses to which the edifice was to be applied; second, the style of architecture required a far greater expenditure than the amount to which the cost of the building was limited. For the purpose of architectural effect the interior was very inconveniently divided; the buttresses, turrets, and towers, while they add very little to the accommodation of the building, greatly increased the cost. To have constructed the building in a substantial and durable manner, in strict conformity with the Lombard style of architecture which was adopted, would have required an expenditure of at least double the amount of the sum appropriated for the purpose. It was, therefore, necessary, in order that the exterior might be constructed in freestone, that the interior should be finished in wood and stucco, and that thus recourse should be had to the presentation of a falsehood to the eye in the very inauguration of an enterprise for the advancement of truth. The two wings and the two connecting ranges were completed in this manner. The main building, which is 200 feet long and 50 wide, embellished with six towers, was also in process of completion, the framing of the interior having been finished, when the underpinning gave way and the whole of the woodwork fell to the ground. After the occurrence of this accident a commission of architects, appointed

to examine the building, reported that the exterior walls were well built, both in regard to construction and materials, but that the plan of finishing the interior in wood and stucco was improper for an edifice intended to contain valuable articles; it was therefore recommended that fire-proof materials should be employed for the portions of the work which remained to be constructed. In conformity with this recommendation the interior of the main building was completed in iron, stone, and brick, with the exception of the roof, which, being covered with slate and not supposed to be exposed to danger from fire, was suffered to remain. It was this change, in the mode of constructing a portion of the edifice, which, during the late fire, saved the contents of the whole from destruction. It, however, increased the cost of the building to upwards of $300,000, leaving the remaining parts of the interior of the structure in perishable materials.

It was hoped that, through the adoption of the compromise propositions, the importance of the active operations would speedily become apparent, and that the plan of erecting an expensive building would be abandoned before more than one of the wings had been completed; but, though the construction of the edifice was, in accordance with the agreement, extended over a number of years, yet in anticipation of such an interference with its ultimate completion, so large a portion of the lower story of the whole structure was commenced in the first two years that it was apparent no successful opposition could be made to its further progress. Nor can Congress be absolved of the charge of having indirectly contributed to encumber the bequest with the cost and maintenance of so extensive a building and so numerous a retinue: with more justice, therefore, may it be invoked to relieve the Institution, in due time, from the burden imposed upon it. It should, however, be remembered, on the other hand, that by repeated enactments Congress has sanctioned the prominence which has been given to the active operations, and acquiesced in the adoption of the special character which has been impressed on the library and museum. It has relieved the Institution from the care of the grounds, also of the copyright books which were intended to swell the number of volumes, and, so far from still considering the museum of the exploring expedition a desirable gift, it has granted for several years past four thousand dollars annually to assist in bearing the expenses of preserving and exhibiting the specimens.

It is to be regretted that Congress directed that provision should be made on a large scale for a library and museum, since each tends to cripple the other, and the whole to diminish the efficiency of the active

operations. A conscientious endeavor, however, has been made to harmonize the whole scheme, by establishing a special library, consisting of the transactions of learned societies and systematic works on all branches of science, together with a limited museum of type specimens, principally of the products of the American continent. And, on the whole, it may be pronounced that, notwithstanding the inauspicious circumstances which attended the commencement of the Institution, as before stated, and the difficulties with which it has had to contend from time to time, the results it has produced have been such as to commend it to the public generally throughout our own country, and to make it favorably known to the cultivators of science wherever found. It has identified itself with the history of almost every branch of knowledge which receives attention at the present day, and its transactions and proceedings are constantly referred to as authoritative on all subjects to which they pertain. With no desire to exaggerate its importance or advantages, the fact may be satisfactorily cited that the recognition of its services in behalf of science exists in the contemporary works of all languages, that its publications are found wherever letters are cultivated, and its specimens in all the principal museums of the world. If it was the desire of the founder to perpetuate the memory of his liberality, that desire has been thus fully gratified; nor is the memorial of his enlightened and comprehensive benevolence limited as to place or time, since it is everywhere renewed with the yearly dissemination of the publications which bear his name.

The following brief sketch of the labors of the Institution up to the present time will not only serve to show what it has done, but also to illustrate the capability of the plan of active operations for producing important results in the way of increasing and diffusing knowledge among men.

ACTIVE OPERATIONS.

Publications.—The Smithsonian Institution has established three classes of publications, in which are contained the articles hereafter to be mentioned. These are as follows:

1. A quarto series, entitled "Smithsonian Contributions to Knowledge," issued in volumes, each embracing one or more separate articles. Of these the fourteenth is nearly through the press.

2. An octavo series, entitled "Smithsonian Miscellaneous Collections," which in the aggregate make six large volumes.

3. Another octavo series, consisting of the annual reports of the Institution to Congress, called "Smithsonian Reports," of which eleven volumes have been published.

The Smithsonian Contributions to Knowledge include memoirs embracing the records of extended original investigations and researches resulting in what are believed to be new truths, and constituting positive additions to the sum of human knowledge.

The series of Smithsonian Miscellaneous Collections contains reports on the present state of our knowledge of particular branches of science; instructions for collecting and digesting facts and materials for research; lists and synopses of species of the organic and inorganic world; museum catalogues; reports of explorations; aids to bibliographical investigations, &c.; generally prepared at the express request of the Institution, and at its expense.

The Annual Reports include the official reports of the Secretary to the Board of Regents of the operations and condition of the Institution; the reports of committees of the board; abstracts of lectures delivered before the Institution; extracts from correspondence; original or translated articles relating to the history and progress of science, &c.

The following rules have been observed in the distribution of the first and second series:

1. They are presented to all learned societies of the first class which publish transactions, and give copies of these, in exchange, to the Institution.

2. To all foreign libraries of the first class, provided they give in exchange their catalogues and other publications, or an equivalent, from their duplicate volumes.

3. To all the colleges in actual operation in this country, provided they furnish, in return, meteorological observations, catalogues of their libraries and of their students, and all other publications issued by them relative to their organization and history.

4. To all States and Territories, provided they give, in return, copies of all documents published under their authority.

5. To all incorporated public libraries in this country, not included in any of the foregoing classes, now containing 10,000 volumes; and to smaller libraries, where a whole State or large district would be otherwise unsupplied.

Institutions devoted exclusively to the promotion of particular branches of knowledge receive such articles published by the Institution as relate to their objects. Portions of the series are also given

to institutions of lesser grade not entitled, under the above rules, to the full series, and also to the meteorological correspondents of the Institution.

The reports are of a more popular character, and are presented—

1. To all the meteorological observers and other collaborators of the Institution.
2. To donors to its library or museum.
3. To colleges and other educational establishments.
4. To public libraries and literary and scientific societies.
5. To teachers or individuals who are engaged in special studies, and who make direct application for them.

Besides the works which have been published entirely at the expense of the Institution, aid has been furnished by subscription for copies to be distributed to foreign libraries of a number of works which fall within the class adopted by the programme. The principal works of this kind for which subscriptions have been made are as follows : Agassiz's Contributions to Natural History, Gould's Astronomical Journal, Shea's American Linguistics, Runkle's Mathematical Monthly, Deane's Fossil Footprints, Tuomey & Holmes's Fossils of South Carolina, Peirce's Analytic Mechanics.

Meteorology.—The investigation of all questions relative to meteorology has been an object to which the Institution has devoted special attention, and one of its first efforts was to organize a voluntary system of observation, which should extend as widely as possible over the whole of the North American continent. It induced a skilful artisan, under its direction, to commence the manufacture of carefully prepared and accurately graduated instruments, now generally known as the Smithsonian standards. It prepared and furnished a series of instructions for the use of the instruments and the observations of meteorological phenomena ; also three series of blank forms as registers.

It next organized a body of intelligent observers, and in a comparatively short time brought the system into practical operation ; each year the number of observers increased, and where one ceased his connexion with the enterprise, several came forward to supply his place. By an arrangement with the Surgeon General of the army, the system of observations at the United States military posts in different parts of the country, and also that which had previously been established by the State of New York, were remodelled so as to harmonize with that of the Institution. Gentlemen interested in science, residing in the British provinces, and at nearly all the posts of the Hudson's Bay Company, also in Mexico, Central America, the West In-

dies, and some places in South America, &c., joined in the enterprise; and, with few exceptions, at the beginning of the war every district of considerable size had in it at least one if not more observers. All these contribute their services without compensation, their only reward being the satisfaction of co-operating with each other and the Institution in the effort to supply data and materials for investigation. Any returns, indeed, which the Institution has in its power to make are gladly rendered in a hearty acknowledgment of assistance, and in copies of all the Smithsonian publications likely to be of interest.

Besides the materials obtained directly from the observers of the Institution, a large amount of other matter relative to the meteorology of North America has been accumulated—such as copies of all the known series of records for long periods which could be obtained; series which have been compiled during explorations and surveys for the government, those which have been the result of local associations, and of the system of observations established in connexion with the survey of the great lakes, as well as of the common school system of Canada, and many thousand notices of the weather at different times and places, collected from newspapers and periodicals.

No other part of the world has offered such facilities for the collection of meteorological data, the system extending over so large a portion of the earth's surface; the observers, with few exceptions, all speaking the same language, and many of them being furnished with full sets of compared standard instruments.

It is to be regretted that this system has been partially interrupted during the war, and that the portion of the income of the Smithsonian fund, which could be devoted to the reduction and discussion of the material collected, has not been adequate to the labor of deducing from so large a body of data all the valuable truths which they are capable of affording. It has had assistance, however, from the agricultural department of the Patent Office, by which the results of five years' observations of all the elements and a series of temperatures for long periods have been prepared for publication.

From all the observations made up to 1860, isothermal charts were constructed, presenting much more accurately than had ever been done before, the distribution of temperature over the continent of North America; a series of rain charts, and also a large map exhibiting the regions of original forest, of arable prairie and of desert in the United States, have also been prepared.

The Institution has fully established the fact, which was previously

indicated in regard to storms, by the investigations of Mr. Espy and others, in relation to the United States, namely, that all such meteorological phenomena, as variations in the pressure of the atmosphere, sudden changes of temperature, either of unusually warm or cold weather, thunder-storms, tornadoes, as well as storms of wind, rain, &c., which occur within the temperate zones, travel from west to east. The simultaneous system of observations established by the Institution furnished the means of placing this great law of meteorology in prominent relief, and of first reducing it to practical utility.

As early as 1849 the Institution organized a system of telegraphic despatches, by which information was received at Washington of the condition of the weather at distant places in the southwest and northwest, and from this, in accordance with the law before mentioned, it was often enabled to predict, sometimes a day or two in advance, the approach of any larger disturbances of the atmosphere. Subsequently the telegraphic despatches were daily exhibited at the Institution on a map of the United States by means of a series of movable cards of different colors, which indicated the meteorological condition at various points, showing at a glance in what parts of the country it might be clear or cloudy, raining or snowing; and by arrows the existing direction of the wind. The returns were also published in one of the evening papers. Unfortunately this enterprise was interrupted by the cessation of the observations in the southwest, and by the constant use of the telegraph for the purposes of the government.

The advantages possessed by the Smithsonian Institution for investigations of this kind will be evident, when it is recollected that a large portion of its observers are stationed west of Washington, that the phenomena approach it over a large extent of land, and can be critically noted through every part of their passage eastward, while the phenomena which are presented to the meteorologists of Europe traverse in reaching them a wide expanse of ocean, from which only casual observations can be gleaned.

The publications of the Institution contain many memoirs which have tended to advance the science of meteorology. Among these may be mentioned the meteorological and physical tables prepared at the expense of the Institution by Professor Guyot, and filling a large octavo volume of the Miscellaneous Collections. No work extant answers the same purpose with the one referred to, which has hence become a general standard of reference, the constant demand for it

as well in Europe as America having required the printing of several successive editions.

The results of the reductions for five years previous to 1860 have been published in two volumes of nearly 2,000 quarto pages, containing a mass of materials of great value in determining the average temperature, fall of rain, barometrical pressure, moisture, direction of the wind, and time of various periodical phenomena relative to plants, animals, &c.

In addition to these large and important volumes, other works have been published by the Institution which have had a marked influence on the progress of meteorology. Among these may be mentioned the works of Professor Coffin, on the winds of the northern hemisphere; of Mr. Chappelsmith, on a tornado in Illinois; of Professor Loomis, on a great storm which pervaded both America and Europe; the reduced observations for twenty-eight years of Professor Caswell, at Providence, Rhode Island; of Dr. Smith, for twenty years in Arkansas; of Dr. Kane and Captain McClintock, in the arctic seas; on the heat and light of the sun at different points, by Mr. Meech; on the secular period of the aurora, by Professor Olmsted; the occurrence of auroras in the arctic regions, by Mr. P. Force, &c.

Besides these, a series of meteorological essays embodying many of the results obtained from the investigations at the Institution has been prepared by the Secretary, and been published in the agricultural reports of the Patent Office.

Astronomy.—The Institution has advanced the science of astronomy both by its publications and the assistance rendered to observers. To facilitate astronomical observations, it prepared and published for six years an annual list of occultations of the principal stars by the moon, and printed and distributed a series of tables for determining the perturbations of the planetary motions, the object of which determination is to facilitate the calculation of the places of the heavenly bodies. These tables have accomplished the desired end, saving to the practical astronomer an immense amount of tedious and monotonous labor.

The name of the Institution has been favorably connected with the history of the interesting discovery of the planet Neptune. From a few of the first observations which had been made on this planet Mr. Sears C. Walker calculated its approximate orbit, and by this means tracing its path through its whole revolution of 166 years he was enabled to carry it backward until it fell among a cluster of stars, accurately mapped by Lalande, towards the close of the last century.

After minute inspection he was led to conclude that one of the stars which had been observed by Lalande in 1795 was the planet Neptune. He was thus supplied with the amount of its motion for upwards of fifty years, from which he deduced a much more perfect orbit, and was enabled to construct an ephemeris giving the place of the planet for several years in succession. These investigations, so interesting to astronomy and honorable to this country, were prosecuted and published at the expense of the Institution, the name of which will be further connected with the planet Neptune by the publication, now in press, of a new discussion of all the observations which have been made on this body for the last fifteen years. This work, which is by Professor Newcomb, of the United States navy, will furnish not only the means of determining the exact position of Neptune for years to come, but also the data for ascertaining whether it is affected by other bodies than those now known to astronomers.

To render more generally accessible to practical astronomers in this country the theory of the motion of the heavenly bodies by the celebrated Gauss, the Institution shared the expense of publishing a translation of this treatise by Admiral C. H. Davis, U. S. N., from the Latin. It furnishes a complete system of formulas for computing the movements of a body in any of the curves belonging to the class of conic sections, and a general method of determining the orbit of a planet or a comet from three observations, as seen from the earth.

For a number of years aid was afforded to the publication of Gould's American Astronomical Journal, which rendered good service to the science by making promptly known to foreign observers the results of the labors of their contemporaries in America. It has also had reduced by Mr. Charles A. Schott, and published at its own expense, the astronomical observations made by Dr. Kane in the arctic regions, and has now in hand those which were made in the same regions by Dr. Hayes.

Congress having authorized in 1849 an astronomical expedition under Lieutenant Gilliss to the southern hemisphere for the purpose of determining the parallax of the planets, and consequently their distance from the sun, by observations on Venus and Mars, accidentally failed to make the appropriation for instruments. This omission was supplied by the Institution, which was subsequently indemnified for the expense by the Chilian government.

In the observation of all the larger solar eclipses which have happened since the date of its organization the Institution has actively

and efficiently co-operated by publishing projections of the phases and times of their occurrence in different parts of America.

Under its auspices, and partly at its expense, an expedition was inaugurated by Lieutenant Gilliss to observe the great eclipse of 1858 in Peru, from which data of value for the improvement of solar and lunar tables were determined, besides facts of interest in regard to the physical constitution of the sun.

Assistance was also rendered to the expeditions under the direction of the Coast Survey to observe the eclipse of July 18, 1860, one of which was sent to Labrador, under the charge of Professor S. Alexander, of New Jersey, and the other to Washington Territory, under that of Lieutenant Gilliss.

To these may be added an account of an instrument invented by Rev. T. Hill, president of Harvard College, for the projection of eclipses.

Physics and chemistry.—The Institution has fostered these sciences in many different ways; among others, by importing models of the most improved articles of apparatus, and making them known to scientific men through lectures and otherwise.

It has instituted an extensive series of experiments on building materials, particularly in reference to those employed by the government in the construction of the Capitol and other public edifices; also a like series on acoustics, as applied to public halls, and the principles deduced from these were practically applied in the construction of a model lecture-room. It has made a very extended series of experiments on different substances employed for light-house illumination, from which has resulted the substitution of another material for sperm oil, and the consequent annual saving of a large amount of money to the government.

In compliance with requests made by different departments of the government and of Congress, particularly since the war, it has conducted various series of investigations, principally in relation to questions involving mechanical, chemical, and physical principles, and has made reports on subjects of this kind amounting, in the aggregate, to several hundred.

To facilitate researches, a laboratory has been established and kept constantly in working condition, the privilege of using it having been given to various competent persons for experimenting in different branches of physical science. Just now it is occupied by Dr. Wetherill for the purpose of conducting a series of analyses of samples of

air from the halls of Congress, &c., from which a report is to be made, under the direction of the Institution, on the ventilation of the public buildings of this city.

The most important publications under this head are the researches relative to electric currents, by Professor Secchi; on the explosibility of nitre, by Dr. Hare; on the ammonia-cobalt bases, by Drs. Gibbs and Genth; and on astronomical photography, by Dr. Henry Draper.

A valuable report on recent improvements in the chemical arts by Booth & Morfit was published in 1852, and there have been given in the annual reports of the Institution a series of translations and articles presenting a view of the progress of physics and chemistry from year to year, since 1853, among which we may particularly notice the translation of Müller on recent contributions to electricity, and the reprint of Powell on Radiant Heat.

Terrestrial magnetism.—The subject of terrestrial magnetism has been prosecuted simultaneously with that of meteorology, and an observatory was erected in the Smithsonian grounds, fitted up with the most approved instruments, and conducted under the joint auspices of the Institution and of the Coast Survey. After remaining in operation for several years, the instruments were transferred to Key West, as a remote station where observations were still more desirable. Instruments were also furnished an expedition to Mexico, and used with much success by Mr. Sonntag, whose results were published in the Smithsonian Contributions to Knowledge. Apparatus was also furnished to Dr. Kane, Dr. Hayes, and other explorers, by means of which valuable results were obtained.

Of the more important publications of the Institution, which have tended to advance this science, may be mentioned the articles by Dr. Locke, on the dip and intensity; the elaborate discussion, by Professor Bache, of the magnetic observations made at Girard College from 1841 to 1845; the report on magnetical observations in the arctic seas by Dr. Kane, reduced at the expense of the Institution by Mr. C. A. Schott, and those made in Pennsylvania and adjacent States by Professor Bache, and in Mexico by Mr. Sonntag.

Explorations.—In the deficiency of means for more extended operations, as has been frequently represented in the annual reports, the efforts of the Institution in the line of explorations and collections are confined, as strictly as possible, to America; but within this limit there are few regions which have not furnished scope, in some form, to its activity. Arctic America, all the unknown portions of the

United States, Mexico, Central and South America, and the West Indies, have been laid under contribution for facts and materials by which to advance science.

An eminently useful influence has been exerted by the Institution through the aid it has afforded in the organization of the different government explorations by land and by sea. Whether by official representations to the heads of departments, or personal influence with officers and employés, it has secured the engagement of individuals competent to collect facts and specimens; it has instructed persons thus engaged, and others, in the details of observation; it has superintended the preparation, and, in some cases, borne the expense of the necessary outfits; has furnished fresh supplies from time to time to the collectors while in the field; received the collections made, and preserved them for future study, or at once consigned them to the hands of competent persons, both at home and abroad, for investigation; directing the execution of the necessary drawings and engravings for the reports, and, finally, superintending the printing and even the distribution of any available copies of the completed works to institutions of science. Prior to the establishment of the Institution but little had been done by our government in the way of scientific explorations, with the exception of that under Captain Wilkes. But since then nearly every United States expedition, whether a survey for a Pacific railroad route, a boundary line between the United States and regions north or south of it, or within its borders, a wagon-road across the Rocky mountains, or an ordinary topographical exploration, has been influenced and aided more or less, as above stated. A list of the expeditions has been, from time to time, published in the annual reports, and it is sufficient here to say that their total number up to the present time is about fifty.

Besides these, similar explorations have been carried on without any reference to the government, and either entirely or in a great measure at the expense of the Institution, and always at its suggestion, or under its direction. Prominent among these may be mentioned the three years' researches in the arctic regions, by Mr. Kennicott, with the co-operation of gentlemen of the Hudson's Bay Company; of Mr. Drexler, in the region of Hudson's bay, and also in the Rocky mountains; of Mr. Coues, in Labrador; of Lieutenant Feilner, in Nebraska and Northern California; of Mr. John Xantus, at Fort Tejon, Cape St. Lucas, and in Western Mexico; of Lieutenant Trowbridge, on the coast of California; of Drs. Cooper and Suckley, in Western America generally; of Drs. Coues and Beers, in Kansas,

New Mexico, and Arizona; of Dr. Irwin, in Arizona; of Dr. Hitz, about Laramie Peak; of Lieutenant Couch, in Texas and Mexico; of G. Wurdemann, Lieutenant Wright, Captain Woodbury, and others, in Florida and the Gulf of Mexico; of Dr. Sartorius, Professor Sumichrast, Dr. Berendt, in Mexico; Dr. Von Frantz, J. Carniol, in Costa Rica; of Mr. March, in Jamaica; of Mr. Wright, Dr. Gundlach, Professor Poey, in Cuba; Judge Carter, in Bolivia, besides many others.

In addition to the collections which have been received from explorations organized under the direction of the Institution, large numbers of duplicate specimens have been presented by the meteorological observers and other Smithsonian collaborators, the whole forming a body of material for the illustration and study of the products of the American continent unequalled by any collection previously made. The explorations, however, as might be inferred, have not been confined to the collecting of specimens, but have also furnished information relative to the topography, geology, physical geography, ethnology, and the living fauna of the regions visited.

The results have been published by government, the Institution, or other parties. The extent and importance of these publications may be seen in the volumes of the reports of the Pacific railroad and Mexican boundary surveys; of the United States astronomical expedition to Chili, under the late lamented Captain Gilliss; of Captain Stansbury's exploration of Utah; of Lieutenant Michler's of the Isthmus of Darien, &c., &c.; in the volumes of the Smithsonian publications, and in the transactions of nearly all the scientific institutions in the United States.

In order to facilitate the operations of collectors, a series of general directions have been prepared and widely distributed, free of charge, for collecting, preserving, and transporting specimens of natural history, and also special instructions for collecting nests, eggs, shells, insects, &c.

Description and distribution of collections and specimens.—The object of making these collections, in conformity with the policy of the Institution, was not merely to supply a large museum in Washington with permanent specimens or duplicates for exchange, but to furnish the naturalists of the world with the materials for advancing the science of the natural history of North America, and of facilitating the study of its various branches by supplying museums both in the United States and in Europe with sets of type specimens.

In pursuance of this object, full sets of the specimens collected have been submitted to a large number of naturalists, both in this country and abroad, for critical study and description, and it is not too much to say that scarcely a monographic investigation has been conducted for ten years past in any branch of American zoology which has not derived part or the whole of its material from the Smithsonian collections. Duplicates of the specimens, when described, have been made up into series for distribution, always accurately labelled, and are usually types of some published investigation. The average of such distribution has, for the last ten years, been at least ten thousand specimens annually, while the distribution of 1864 amounted to nearly five thousand species and seventeen thousand specimens. In this way, besides supplying the principal museums of Europe with specimens, all the older museums in this country as well as Canada have been largely increased, and the foundation for several new establishments of a similar kind has been furnished. As an illustration of what has been done in the way last mentioned, I may cite the large donation of labelled specimens which has been made to the museum of the University of Michigan, and the co-operation which has been afforded the liberal-minded citizens of Chicago in founding a museum and establishing a society of natural history, which, under the direction of Mr. Kennicott and Dr. Stimpson, is diffusing a taste for the study of nature in that city of unparalleled growth, which cannot be otherwise than highly salutary in ameliorating the sensual effects of great material prosperity.

The Institution has also done good service in promoting and assisting the formation of local societies in rural districts for the collection of specimens and the recording of natural phenomena. To all societies of this kind, as well as to colleges and academies making special application, labelled specimens have been presented.

This distribution of specimens is very different from the ordinary exchanges conducted between institutions or individuals, which usually involve the return of an equivalent. The question with the Smithsonian Institution is, not what can be had in return, but where a particular specimen or series of specimens can be placed so as best to advance the cause of science, by being most accessible to the largest number of students engaged in original investigations.

Palæontology, geology, physical geography, &c.—Appropriations have been made for investigations of the surface formation of the Connecticut valley by Professor E. Hitchcock, and for the collection of materials for the illustration of the geology and palæontology of par-

ticular regions. Appropriation has also been made to Professor Guyot for a barometrical survey of the different parts of the Alleghany mountains, and to other persons for collecting observations on heights, as determined in different parts of the country by the various canal and railway surveys.

The publications on these subjects, besides the papers of Professor Hitchcock on surface geology, are as follows:

A memoir on *Mosasaurus*, by Dr. R. W. Gibbs.

On the extinct species of the fossil ox and sloth of North America, and on the ancient Fauna of Nebraska, by Dr. Leidy.

On the Physical Geography of the Mississippi Valley, by Charles Ellet.

On the Law of Deposit of Flood Tide, by Admiral Davis.

On the Fluctuations of the level of the great American Lakes, by C. Whittlesey.

On the Palæontology of the Upper Missouri, and Check List of miocene, cretaceous and jurassic Invertebrata, by F. B. Meek.

A memoir by Dr. Leidy, now in press, on the extinct reptiles of the cretaceous period, will, it is believed, be a valuable manual of reference.

The Institution has published a Check List of minerals, with their symbols, prepared by Mr. Egleston, with special reference to facilitating the labelling of the Smithsonian minerals and the exchange of specimens, and it may be mentioned that extensive distribution has been made of specimens of building stone employed by the government.

Botany.—This branch of general natural history has been advanced by the Institution, not only by means of the publication of original memoirs, but also by explorations and collections made at the expense of the Smithsonian fund. The most important work which has been published is a large quarto volume, illustrated by expensive colored plates, on the algae of the entire North American waters. The work was written for the Institution by Dr. Harvey, of the University of Dublin, and has been the means of rendering this order of the vegetable kingdom more generally known. The Institution has also published several papers on the plants of New Mexico and California, by Dr. Gray, of Cambridge, and Dr. Torrey, of New York.

Duplicates of the specimens described have been presented to institutions at home and abroad. Considerable labor has also been ex-

pended in the preparation of an original report on the forest trees of America, by Dr. Gray. This work, however, has been interrupted for some time, but will be resumed, it is expected, during the present year.

General Zoology.—A large part of the collections made by the Institution belong to the general class of zoology, intended to advance the study of animal life upon the continent of America.

The ornithology of America has always been a speciality of the Smithsonian Institution, more efforts having been made to perfect its collection in this department than any other. The Institution has published the first part of a work by Dr. T. M. Brewer, suitably illustrated, on the distribution and habits of North American birds during the breeding season, with descriptions and figures of their eggs, the materials being derived entirely from the collections of the Institution, and mostly made at its special request. This is the first separate work on North American zoology ever prepared. A catalogue of North American birds, prepared by Professor S. F. Baird, has been extensively used at home and abroad in labelling collections.

Professor Baird is now engaged in preparing a general report on our knowledge of North American ornithology to the present date, with the addition of the species of Central and South America and the West Indies; the materials being derived almost entirely from the specimens collected by the Institution, which have been increased since the publication of the extensive work on the same subject by Professor Baird in the Pacific railroad report, from 12,000 to 35,000.

The collections which have been made by the Institution for the illustration of mammalia have been very extensive, amounting to 6,000 specimens, and have not only included many duplicates of the species previously known, but a very large number entirely new to science. A catalogue of North American mammals, chiefly those collected by the Institution, prepared by Professor Baird, has been published and distributed to those interested in the study; also a monograph of North American bats, prepared by Dr. H. Allen. Materials are now in course of accumulation to complete the account of the classes of mammals of North America which have not been included in the publications of the Institution and Pacific railroad reports.

As with all American vertebrata, the collections of reptiles and fishes made by the Institution have been very extensive, and numer-

ous monographs or articles have been published relative to them in the Pacific railroad reports and the proceedings of different natural history societies, the Institution having published a synopsis of the serpents of North America, and a monograph of the Cottoids.

The Institution has materially aided the study of the entomology of this country, not only by the collections in that branch, but by preparing and publishing a series of works for the purpose of exhibiting the state of knowledge on the subject and facilitating its further advancement. It has published and distributed the following under this head :

Instructions for collecting and preserving insects, and catalogues, synopses, or monographs of the Diptera, Coleoptera, Lepidoptera, and Neuroptera, prepared by the most competent authorities in Europe and America.

It has also in course of preparation works relative to the Hymenoptera, Homoptera, Hemiptera, Orthoptera, &c.

In the preparation of these publications the Institution is indebted for gratuitous assistance to Dr. Jno. Leconte, Baron Osten Sacken, and others.

Conchology.—A large collection of specimens of shells was received from the United States exploring expedition, which has been much increased by subsequent additions. All the shells of the west coast of the United States, and those generally collected by the exploring expedition, have been put into the hands of Mr. P. P. Carpenter, of England, the new ones to be described for publication, and the duplicates of the whole to be arranged for distribution to museums, colleges, and other establishments. This work is nearly completed, and a large number of partial sets of the shells have been distributed in accordance with the plan just mentioned. The publications on this subject are lists of North American shells, circulars relative to collecting, an elementary introduction to the study of conchology, and an extensive work in two octavo volumes on the Bibliography of North American Conchology, by W. G. Binney, and a monograph of the Corbiculadæ, by Temple Prime. Besides these a number of articles are in the press or in course of preparation.

Microscopy.—Encouragement has been given to this branch of science by importing, as samples, simple forms of working microscopes, and also by stimulating our native artists to greater exertion in the construction of this instument, by ordering the best that could be produced. Samples of microscopic organisms have been collected

and distributed to observers, and examinations and reports have been made on a large number of this class of objects sent to the Institution. The publications in regard to this subject are a number of papers by Professor Bailey, of West Point, and a very interesting memoir by Dr. Leidy, of Philadelphia, on a fauna and flora within living animals.

Physiology.—No experiments on this subject have been made under the immediate direction of the Institution, although it has furnished the materials for investigation by other parties. The publications in regard to it are chemical and physical researches concerning North American vertebrata, by Dr. J. Jones; researches upon the venom of the rattlesnake, with an investigation of the anatomy and physiology of the organs concerned, by Dr. S. W. Mitchell; on the breathing organs of turtles, by Drs. Mitchell and Morehouse; on the anatomy of the nervous system of rana pipiens, by Dr. J. Wyman; and on the medulla oblongata by Dr. John Dean.

Ethnology and Philology.—One of the earliest efforts on the part of the Institution was directed to the advancement of the science of American ethnology. Its first publication as well as introductory volume to the series of Smithsonian Contributions to Knowledge, being the work of Squier and Davis, on the ancient monuments of the Mississippi valley, remains the standard treatise on this subject. This was followed by a similar work on the antiquities of New York, by Mr. Squier; and those of Wisconsin, by Mr. Lapham, of Ohio; and of Lake Superior, by Mr. Whittlesey; a memoir on some antiquities of Mexico, by Brantz Mayer; and a general introduction to the whole subject of American archæology, by Mr. Haven, besides many articles of less extent in one or another of the Smithsonian series. Several pamphlets of instructions for making observations and collections in this science have also been issued.

In the department of philology, also, the Institution has evinced its zeal and activity by the publication, among others, of the elaborate work on the Dakota language, by Mr. Riggs; that on the Yoruba language, by Mr. Bowen; and that on the Chinook jargon, by Mr. Turner and Mr. Gibbs. To Mr. Shea, of New York, who is engaged in the preparation of a library of American languages, annual appropriations from the funds of the Institution have been made in furtherance of the publication of linguistic memoirs furnished by its correspondents.

Systematic efforts have been directed by the Institution to the collection of as perfect a series as possibleof the specimens of Ameri-

can antiquities, and of those illustrative of the habits of the modern native tribes. Already an extensive collection has been accumulated, and the preparation and distribution of a series of colored casts of the more interesting specimens of aboriginal art have been commenced. The former picture gallery had just been fitted up with cases two hundred feet in length, for the reception of these, when the disastrous fire occurred, which destroyed the upper part of the centre building; fortunately, however, before any of these specimens had been placed in the room.

Correspondence.—The Institution has constantly received a large number of communications, asking information on a variety of subjects, particularly in regard to the solution of scientific questions, the names and characters of objects of natural history, and the analysis of soils, minerals, and other materials which pertain to the industrial resources of the country. Answers have in all cases been given to these inquiries, either directly by the officers of the Institution or by reports from the Smithsonian collaborators. A considerable portion of the correspondence burned in the office of the Secretary was of this character. The loss in this case is to be regretted, not only on account of the valuable information the letters and answers contained, but also on account of the illustration they afforded of the influence of the Institution, and the condition of the public mind at a given time. Every subject connected with science which strongly attracts popular attention never fails to call forth a large number of inquiries and suggestions.

International exchanges.—To facilitate the direct correspondence between the learned institutions and scientific men of the two worlds, and the free exchange of their publications, has, from the first, been a special object of attainment with the Smithsonian Institution. Year by year its plans for this purpose have been modified and improved, until the system has become as nearly complete and satisfactory as the funds and force at its disposal will allow. At the present day it is the great medium of scientific intercommunication between the New World and the Old; its benefits and services being recognized alike by individuals, institutions, and governments. Its parcels pass all the custom-houses without question or interference, while American and foreign lines of transportation, with rare exceptions, vie with each other in the extent of the privileges accorded it. To so great an extent has its sphere of activity been enlarged, that it is no exaggeration to say that a very large proportion of all international exchanges of the kind referred to are now made through its instrumentality.

At the present time the Institution is prepared to receive, at periods made known through its circulars, any books or pamphlets of scientific, literary, or benevolent character which any institutions or individuals in America may wish to present to a correspondent elsewhere, subject only to the condition of being delivered in Washington free of cost, and of being accompanied by a separate list of the parcels sent. Where any party may have special works to distribute, the Institution is always prepared to furnish a list of suitable recipients. In many cases where works of value have been published by the United States or State governments, likely to be of importance to students abroad, application has been made by the Institution for copies, in most cases with success. The articles and volumes, when received, are assorted and combined into packages, and these, after being properly addressed and enclosed in boxes, are despatched to the agents of the Institution in London, Leipsic, Paris, and Amsterdam. The boxes are there unpacked, and the contents distributed through the proper channels ; the returns for these transmissions are received by the same agents, and boxed, and forwarded to Washington, from which point the parcels for other parties are sent to their proper destination. All the expenses of packing, boxing, agencies, freights, &c., are borne by the Institution, with the exception of the local conveyance of single parcels by express or otherwise within the United States.

LOCAL OBJECTS.

Under this head we have classed those parts of the programme which were indicated by Congress, and which do not, so directly as the objects we have already described, contribute to the advance of knowledge. It will be seen, however, that they have been made as far as possible to harmonize with the active operations, and to assist in their progress.

Library.—Although the act of Congress directed that provision should be made for the accommodation of a library, on a liberal scale, it was soon seen, after the organization of the Institution, that it would be impossible, from the income which could be devoted to it, to establish a first-class general library. Even had this been practicable, it would still have seemed superfluous to do so in the very vicinity of the miscellaneous library of Congress, which is every year increasing in extent under the liberal appropriations which are annually made for the purchase of books. It was therefore deemed

preferable, and more consonant with the purposes of the Institution, to form a special library, which might constitute, as it were, a supplement to the library of Congress, and consist, for the most part, of complete sets of the proceedings and transactions of all the learned societies in the world, and of other serials essential for reference by students specially engaged in original scientific research. The efforts of the Institution to carry out this plan, which has since been sanctioned by Congress, have been eminently successful. Principally through exchanges, and occasionally by purchase, a more complete collection of the works above mentioned has been procured than is to be found in any library of the United States, or is easily met with even in Europe. The Institution has been assisted in making this collection by the liberality of many of the older libraries abroad, which, on application, have furnished from their duplicates volumes and even whole sets to complete series of works long since out of print, and which, in some cases, could not have been obtained through any other means. The library is also quite rich in monographic or special treatises in the physical and natural sciences, lacking as yet, it is true, some of the more expensive volumes, but still affording the means of prosecuting almost any scientific investigation. One specialty consists of the large number of maps and charts obtained by exchange from geographical and hydrographical establishments, &c. This collection is as complete as any in the country.

No effort is spared to render the library of the Institution conducive to the advance of science. Two editions of the catalogue of serial works have already been published, and a third is now in press; this will probably fill four hundred octavo pages, and will be completed in the course of the present year, to be followed by a catalogue of the special works.

As in most libraries of special character, and, indeed, in most large public libraries, the public are allowed free access to the library-room during office hours, but are not generally permitted to take books away. When, however, any applicant is known to be engaged in the prosecution of original investigations, which promise to advance science, and requires the assistance of books found in the Smithsonian library, they are freely lent, even to persons in the remote portions of the United States. Any losses which may occur by the adoption of this course are more than compensated by the advantages derived from it.

Congress had provided by the law of organization that a copy of all copyright works should be presented to the library of this Institu-

tion. This it was supposed would be the means of securing important additions to the library. It was found, however, in practice, to impose a burden on the funds of the Institution for which no adequate compensation accrued ; copies of the most valuable works were not presented, because there was no penalty imposed for the neglect to comply with the requirement, and the expense of clerk-hire in recording and furnishing certificates was greater than the value of the articles received, consisting, as they did principally, of sheets of music, labels of patent medicines, novels, and elementary works of instruction. The law was, therefore, on special application, so modified that authors were required in future only to send a copy of their works to the copyright bureau of the Department of the Interior and to the Library of Congress.

A special library of the character above described, consisting of serials, must of necessity constantly increase with the additions made to the series of the existing associations which annually publish their transactions. The Smithsonian library, therefore, comprises a principle of indefinite augmentation, both as regards extent and value ; and although this increase will result mainly from the exchanges produced by the active operations, yet additional accommodations will be constantly acquired. Hence it may become a matter of consideration, hereafter, whether, since Congress has appropriated $160,000 to the enlargement of the accommodation for its own library, it may not be expedient to request that the Smithsonian collection be received and arranged as one of its departments, while the free use and general control of the same shall still be retained by the Institution.

Museum.—The same remarks which have been made in regard to the library may, with little modification, be applied to the museum. The portion of the funds of the Institution which it is practicable to devote to the museum is not sufficient to support an establishment of this kind worthy of the seat of government of the United States. Indeed, it is generally now conceded by those who have critically examined the subject, that the accommodation and perpetual maintenance of a large collection of objects of nature and art intended for popular exhibition, or even for educational purposes, ought not to have been imposed upon the Smithsonian fund. It has been seen from the foregoing statement how much can be done in the way of advancing natural history independent of a costly edifice, and the support of a popular museum in which are to be continually exhibited even type specimens. It is true that specimens of this character ought

to be preserved for study; but seeing that there are in the country a number of special museums which would gladly become the custodians of these objects, and that the hope is yet confidently entertained that Congress will, in due time, establish a national museum which shall rival those of other countries, it has been thought advisable to restrict the collections which are retained in the Smithsonian museum—first, to those made by the exploring expedition, the care of which Congress has devolved upon the Institution; and, second, to such type specimens as are thought of special interest as illustrating the Smithsonian publications.

The museum has been rendered particularly attractive to the visitors and inhabitants of Washington by the large number of birds and mammals which have been mounted for public exhibition, and in this way it has undoubtedly contributed to the popularity, though it has diminished the efficiency, of the Institution. The danger, however, to be guarded against, is the constant tendency to expand the collections, and hence gradually to absorb the income in their support. It should be recollected that the building has borne upon the resources of the Institution with a cost of more than $300,000, and that at least an additional $100,000 will be necessary to repair the recent damages, and this mainly to render the edifice better adapted for the accommodation of the library and museum.

Little has been said in this sketch in regard to the gallery of art. The impropriety of expending the income of the bequest in attempting to form a collection of articles in this line worthy of the country has had no prominent advocates, even among artists; still, in connexion with the museum, a collection has been formed which principally consists of plaster casts of distinguished individuals, and a few pictures which have either been presented to the Institution or are the property of the government. The only purchase in this line which the Institution has made is that from Hon. George P. Marsh, of a series of valuable engravings to illustrate the early history of art.

Lectures.—As a part of the programme of organization finally adopted, courses of lectures were to be delivered, but instead of attempting to furnish popular instruction by this means to all parts of the country, as was at first proposed, the lectures have been confined to the city of Washington; and in order to render them generally useful, synopses of the more important ones have been published in the annual reports. At the commencement of the Institution, and

before the plan of organization was generally understood, special care was taken to invite as lecturers men of prominence in the line of literature that they might have an opportunity to become familiar with the plan adopted, and in this way many prejudices were removed and much information diffused as to the character of the establishment.

The lectures were commenced before the building was erected, the first course being in 1847, by the Rev. Dr. Scoresby, of England, on the construction and use of the large telescope of Earl Rosse, and have been continued every winter up to the present time. Until within the last four years they were well attended, and no doubt produced a beneficial effect; but since the commencement of the war and the introduction into the city of a large number of sources of amusement, the audience has fallen off, or has been composed in a large degree of persons seeking amusement rather than information. The most important result produced by the lectures is that derived from their publication.

Nothing definite can be said at present as to the financial arrangements for the repair of the building. The subject is still before Congress, and although the idea has been confidently entertained that an appropriation would be made for the purpose, yet from the discussion which took place in the meeting of the joint committee of the two Houses appointed to consider this matter, I do not think a resolution authorizing such an appropriation will be adopted. In view of the impression produced by this discussion, at which I was invited to be present, I suggested to the committee that if the members would agree to recommend an appropriation to pay the back premium on coin for the last four years' interest on the Smithsonian fund, and in the event of the success of the recommendation, I thought the Regents would have it in their power to finish the repairs by means of the extra fund which has been accumulated.

Respectfully submitted.

JOSEPH HENRY, *Secretary.*

WASHINGTON, 1865.

DRAPER'S TELESCOPE.

BY THE REV. T. W. WEBB, A.M., F.R.A.S.

From the "Intellectual Observer," London.

It is gratifying to observe that, amidst all the calamities and distresses and confusion of a most unhappy civil war, the studies of peace have not been wholly lost to sight. A remarkable instance of this is afforded by the recent appearance, among the publications of the American Smithsonian Institution, of a very interesting and valuable memoir, "On the Construction of a Silvered Glass Telescope, 15½ inches in aperture, and its use in celestial photography, by Henry Draper, M.D., Professor of Natural Science in the University of New York." A copy of this, through the courtesy of the author, being now in my hands, I have thought that some account of its contents might prove interesting, especially at a time when silvered glass specula are attracting some attention in England, and (unless we are much mistaken) are likely to be more generally known and valued as most important aids to the progress of observation.

The opening sentence of this memoir requires, however, we venture to think, a little qualification. "The construction of a reflecting telescope capable of showing every celestial object now known," Dr. Draper tells us, "is not a very difficult task." We should have no hesitation in expunging the negative here, unless it were permitted to add, "when study, and labor, and ingenuity, and perseverance have been brought to bear upon it, equal to those displayed by Dr. Draper." His subsequent remark is of more universal application: "The cost of materials is but trifling compared with the result obtained; and I can see no reason why silvered glass instruments should not come into general use among amateurs. The future hopes of astronomy lie in the multitude of observers, and in the concentration of the action of many minds." His first idea was derived from an examination, in 1857, of Lord Rosse's great reflector, and of the machinery by which it was perfected; and on his return home in the following year, he resolved to construct a similar, though smaller instrument, larger, however, than any in America, and adapted to celestial photography. A metal speculum was first completed, but was split in two during the winter of 1860 by the expansion of a few drops of water that became frozen in the supporting case; and his attention was then, at Sir John Herschel's suggestion, turned to silvered glass mirrors, as reflecting more than 90 per cent. of incident light, with only ⅛th of the weight of metal. The year 1861 was occupied in overcoming the difficulties of grinding and polishing three 15½-inch disks of glass, as well as a variety of smaller pieces. Three similar mirrors were found almost essential, as two would often be so much alike that a third was necessary to gain a further step in advance. One was made to acquire a parabolic figure, (see Intellectual Observer, iii, 213,) and bore a power of 1000. The winter was spent in perfecting the art of silvering and studying photographic

for 1865

REPORT OF THE SECRETARY

OF THE

SMITHSONIAN INSTITUTION

TO THE

BOARD OF REGENTS,

JANUARY, 1866.

BEING A PART OF THE ANNUAL VOLUME OF THE INSTITUTION FOR THE YEAR 1865.

WASHINGTON, D. C.
1866.

REPORT OF THE SECRETARY.

To the Board of Regents :

GENTLEMEN : The principal object of the annual report of the Secretary is to present to the Board of Regents, at the beginning of their session, such an account of the events and operations of the previous year as may serve as the basis of their deliberation, as well as furnish the materials for a connected history of the Institution. Besides this, however, it is desirable that each report should contain such brief expositions as may tend to keep the ever-changing public informed as to the true character of the establishment and of the results it is intended to produce. The importance of these repetitions will be evident when it is recollected that these reports follow each other after a considerable interval of time, are in great part distributed to different persons, and that now, after an interval of little less than twenty years since the first one was published, but few individuals can obtain access to an entire set. Indeed, it is often a matter of surprise to meet so many intelligent persons, even in the city of Washington, who are entirely ignorant of the terms of the bequest on which the Institution is founded, and of the plan which has been adopted to execute the trust thereby devolved upon the government. It can, therefore, scarcely be too often repeated that the Institution is not, as our foreign correspondents often suppose, an association of learned men similar to the scientific societies of Europe and America; that it is not a university for the education of youth, nor an agency for the diffusion of useful knowledge among the people of the United States, but primarily a foundation for enlarging the boundaries of science by stimulating and assisting the researches of original inquirers, wherever found, and for gratuitously diffusing the results of such researches wherever they may conduce to the intellectual or material interests of men.

The general plan adopted for the realization of these benevolent purposes, and steadily pursued from the beginning, has been repeatedly explained in the successive reports, and might, indeed, be gathered from almost any one of them by an attentive consideration of the account given of the operations of each year. In the last report a brief sketch was presented of all that had been accomplished in the

way of advancing science through the agency of the Smithsonian bequest, and in the present report it is purposed to continue this historical account to the close of the year just passed, accompanied with such other particulars as may be needed for better illustration, and such suggestions as may seem necessary in regard to the policy of the Institution.

The most important event of 1865 was the destruction of a part of the building and its contents by the fire of January 24. This event must continue to form an epoch in the history of the Institution; and though it cannot but be considered a most serious disaster, it may yet lead to changes of importance in the correction of tendencies which might ultimately have absorbed the annual income and neutralized the more liberal policy which has thus far been pursued. In view, therefore, of the character of the event, as well as the continuity of the history, it is deemed expedient, before proceeding with an account of the operations of the year, to repeat briefly the facts connected with the origin and results of the fire.

It may be well, however, for the better information of those not acquainted with the Smithsonian building, to premise in regard to it the following particulars: It consists of a main edifice two hundred feet long and fifty wide, with two large wings and two connecting ranges, having in all an extreme length, in an east and west direction, of four hundred and fifty feet. In front and rear of the middle portion are projections, terminated by high towers, two on the north and one on the south side; moreover, on each corner of the middle building is a smaller tower, and also one on each of the two wings.

The whole of the first story of the main building, in a single room, is devoted to the museum; the upper story, in three apartments, was assigned to the lecture room, the gallery of art, and the cabinet of apparatus. The west wing is entirely appropriated to the library; the east wing to the residence of the Secretary and a storeroom for publications and specimens of natural history. The east connecting range contains the laboratory and office rooms; the west range is an extension of the museum. In the large towers were the Regents' room, the offices of the Secretary, storerooms, and workshop.

Though the original plan was much admired for its architectural effect, it was soon found that, in relation to the means at the disposal of the building committee, it was too expensive to admit in its construction of the exclusive use of fire-proof materials; hence, while the exterior was to be constructed of cut freestone, it was concluded to finish the interior in wood and stucco. Fortunately this plan, which

was carried out in regard to the wings, the connecting ranges, and the towers, was abandoned before the completion of the main building. After the exterior of this, including the roof, had been finished, and the framing of the interior was in place, the latter suddenly gave way and was precipitated into the cellar—a mass of broken timber. The attention of the Regents having been called by this accident to the insecurity of the wood-work, they directed that the further progress of the building should be stopped until means could be accumulated for finishing the remainder of the edifice in a more stable manner and with fire-proof materials. In accordance with this direction, after an interval of several years, the construction was recommenced under the direction of Captain (now General) B. S. Alexander, of the Engineer corps, and the whole of the main building, except the inside of the towers and the framing of the roof, which had previously been completed, was finished in a substantial manner in iron and brick work. The architect advised the removal of the roof, but as this would have swelled the cost of the building still further beyond the estimate and the means at command, and as the covering was of slate, the framing under it was thought to be in no danger from fire. This, however, was destined to be the part on which the first attack of the element was to be made. Through a mistake in some workmen, the pipe of a stove which had been temporarily used in one of the upper rooms was introduced through the wall into a furring space resembling a flue, but which discharged the heated air from the combustion into the loft immediately under the roof, instead of into the air, through the true chimney. The rafters were set on fire, and before the burning was discovered the entire wood work under the covering was in flames. The progress of the fire was so rapid, that but few of the contents of the upper rooms could be removed before the roof fell in. The flames soon extended to the large towers, and as these acted as high chimneys, they greatly increased the intensity of the combustion. The conflagration was only stayed by the incombustible materials of the main building. Had the original plan of constructing the interior of the edifice in wood and plaster been fully carried out, the whole structure would have been destroyed, and the valuable library and rich collections of specimens of natural history entirely lost.

The aperture which deceived the workmen was probably made by those who originally plastered the building. It occupied a middle point between two windows, and from its position would naturally lead to the inference that it was designed to conduct the products of

combustion directly into the chimney, from which it was only separated by the thickness of a single brick. For what reason it had not been placed in the middle between the two windows is unknown. It is remembered that some ten years previous to the fire this opening was, during several weeks, used for the insertion of a stove pipe, without suspicion of accident at the time; but in the interval the wood had undergone a process of drying which rendered it more combustible.

Constantly impressed with the fact that the interior of the two wings and the connecting ranges were constructed of combustible material, I have always felt great anxiety on account of the liability to conflagration of these parts of the building. The rest of the edifice, with the exception of the interior of the towers, was supposed to be secure from injury of this nature. A night watch was constantly kept, barrels and buckets filled with water were placed at suitable points, and strict rules were adopted prohibiting the carrying of exposed lights, as well as the practice of smoking, in any part of the edifice. That these precautions were unavailing has been seen; the fire having been communicated at a point where danger was least suspected, and in a manner which rendered its occurrence sooner or later almost inevitable.

The weather at the time was extremely cold, and before the engines could be brought into operation the whole of the roof was in flames. Commencing at the west end of the centre building, the flames were driven by the wind, which blew from that direction, eastwardly, and fortunately away from the library, in the west wing. The destruction of the roof of the main building involved that of the contents of the rooms immediately beneath it, and also those of the three principal towers adjacent. In the former were the Indian portrait gallery, the lecture room, and the apparatus room. The first of these contained the large collection of paintings by Mr. Stanley and a series of Indian portraits belonging to the government. The lecture room was constructed on acoustic and optical principles, and not only answered perfectly the ends for which it was immediately intended, but had served also as a model for lecture rooms in various parts of the country. The apparatus room contained the principal part of the articles presented by the late Dr. Robert Hare, and a large number of instruments of recent construction, intended both for illustration and original research.

The losses in the south tower were, first, the contents of the Regents' room, including the personal effects of Smithson; second, those of a

large room above it, in which were stored the private library of Rev. Dr. Johns, of Virginia, and the public library of Beaufort, S. C., deposited there at the request of Hon. Mr. Stanton, for preservation until the end of the war; and third, in the attic, a large collection of public documents and complete sets of the Smithsonian Reports, intended for distribution. The effects of Smithson had but little intrinsic value, and were chiefly prized as mementoes of the founder of the Institution. They consisted of a number of articles of chemical and physical apparatus, such as were used by him in his perambulatory excursions, two small cabinets of minute specimens of minerals, a silver-plated dinner service, and a trunk filled with manuscripts. The portrait of Smithson while a student at Oxford, a medallion likeness of him in bronze, his library, consisting of 150 volumes, and a small painting were saved. The manuscripts consisted principally of notes on scraps of paper, intended apparently for alphabetical arrangement in a common-place book, after the manner of a philosophical dictionary.

The losses in the north towers were the contents of the offices of the Secretary, including the records and copies of the correspondence of the Institution, the wood-cuts to illustrate the publications, the steel plates of an expensive memoir, several boxes of stereotype plates, a large number of manuscripts of the Secretary on scientific subjects, four memoirs accepted for publication, about a hundred volumes of valuable books from the library, used for constant and immediate reference; a large number of copies of the Smithsonian Reports and duplicate documents; the contents of the workshop, consisting of a lathe, forge, a full set of tools, and an assortment of hardware and materials for the construction and repair of apparatus; and of the upper room of the highest tower, including the clock-work of an anemometer for recording the direction and force of the wind. Not only was this instrument itself lost, but all the records which had been obtained by the use of it for the last seven years. Fortunately, nearly all the other meteorological records, which were in a lower room, were saved.

The Indian portraits, as far as they were the likenesses of particular individuals, in most cases can never be reproduced, but we are gratified to learn that the extensive collection of Mr. Catlin, of a similar character, has been purchased in Europe by Mr. Harrison, of Philadelphia, and will be rendered accessible to the student of ethnology. Besides this, there are in existence, particularly in Canada, other portraits, sufficient in number and variety fully to illustrate the

characteristics of the race. At the same time the loss has fallen very heavily upon Mr. Stanley, the painter and owner of this collection. It was the result of the labor of many years among the Indians; it constituted the pride, as it has been the crowning effort, of his life, and he ardently desired that it might be transmitted to posterity as a monument of his enterprise and industry. The hope is entertained that the government will see fit to give him an order to paint a picture for the Capitol, in which the principal figures of this collection and the characteristics of the Indian race may be portrayed.

The apparatus presented by Dr. Hare was interesting on account of its association with the history of the advance of science in this country. The collection contained most of the articles invented by the donor, and which are described in the scientific journals of the first half of the present century. Among the chemical implements were those used by that distinguished chemist, in procuring for the first time, without the aid of galvanism, calcium, the metallic basis of lime. A number of the articles of apparatus presented by Dr. Hare, though injured by the fire, may be repaired, and I have taken measures for their restoration.

Among the articles of historic interest which were lost is the lens used by Priestley for the evolution of oxygen from the oxide of mercury, and by means of which the first distinct recognition of this elementary substance was effected. It had been presented to the Institution by the nephew of the celebrated philosopher, as was also the apparatus employed by Priestley in his experiments on bodies in condensed atmospheres. The latter was but slightly injured, and can readily be repaired. The other articles of apparatus may be replaced at an expense of about ten thousand dollars.

The most irreparable loss was that of the records, consisting of the official, scientific, and miscellaneous correspondence, embracing 35,000 pages of copied letters which had been sent, at least 30,000 of which were the composition of the Secretary, and 50,000 pages of letters received by the Institution; the receipts for publications and specimens; reports on various subjects which have been referred to the Institution; the records of experiments instituted by the Secretary for the government; four manuscripts of original investigations, which had been adopted by the Institution for publication; a large number of papers and scientific notes of the Secretary; a series of diaries, memorandum and account books. Fortunately, however, a detailed history of the general operations of the Institution is preserved in the printed reports; and a large amount of correspondence connected with natural history and meteorology was saved.

Since the occurrence of the fire all the operations have been carried on in the lower story of the east wing of the building, (the upper part still continuing to be the residence of the Secretary,) and in the several rooms of the adjoining east range. Connected with an office in the latter, the lower story of the tower attached to the southeast corner of the main building has been converted into a fire-proof vault, in which all the valuable papers and records are constantly kept, except for the usually short time they are required for consultation. To insure the wakefulness and fidelity of the watchmen, we have introduced the use of an instrument called a 'detector,' which records the number and the times of his visits to the several parts of the building. For this instrument, which has rendered good service during the past year, we are indebted to the liberality of its inventor, Mr. J. E. Bauerk, of Boston, who, in consideration of the loss which the Institution has sustained by fire, kindly presented it free of charge.

A circumstantial account is given by the building committee of what has been done toward the reconstruction of the edifice. From this it will be seen that the plan adopted contemplates not merely the repair of the damage by the fire, but the restoration of the several parts in fire-proof materials, and with such alterations in the division of the interior space as will better adapt it to the uses of the Institution.

The plans have been prepared and the work superintended by Mr. Adolph Cluss, an architect who was warmly recommended by the mayor of Washington as having been successful in designing and erecting the public school-houses of the city as well as a number of churches and other buildings. These plans have been critically examined and, in some cases, modified by the chairman of the building committee, General Delafield, who, by his knowledge and experience in the line of engineering, has rendered the Institution valuable service.

No appropriation has yet been made by Congress to aid in the restoration of the building. Considering, however, the large amount of government property intrusted to the care of the Institution, it can scarcely be doubted that in a normal condition of the national finances an appropriation for such purpose would have been readily granted.

In consideration of the extraordinary outlay required for the reconstruction of the building, an effort has been made to reduce as much as possible the miscellaneous expenses, and to engage in no enter-

prise that is not absolutely necessary to the continuance of the general operations. So many articles, however, of furniture and stores of hardware and stationery were to be replaced that we have not been able to reduce the expenditures to as low a point as we could wish; yet it will be seen that they fall somewhat below those of the preceding year.

A reference to the report of the Executive Committee will show that the following is the present condition of the fund:

First. The whole amount of money originally derived from the bequest of Smithson is still in the treasury of the United States, bearing interest at six per cent., paid semi-annually, and yielding $30,910 yearly.

Second. Seventy-five thousand dollars of an extra fund are in bonds of the State of Indiana, at five per cent. interest, also paid semi-annually, yielding $3,750.

Third. Fifty-three thousand five hundred dollars of the same fund are in bonds of the State of Virginia, twelve thousand in those of Tennessee, and five hundred in those of Georgia, from which nothing has been derived since the commencement of the war.

The southern State stocks have increased during the year in marketable value, though no interest has been derived from them.

The interest on the original fund for the past year has been paid by the Secretary of the Treasury in coin, under the advice of the Solicitor of the department, who, having investigated the subject, decided that in accordance with the usages of the government the Institution was entitled thus to be paid.

At the end of last year there was a balance in the hands of the treasurer of unexpended interest of $29,484 08, which, with the income on the original bequest and premium on coin, made a disposable fund of $84,956 37; of this sum $39,121 77 have been expended on the building, and $32,115 97 for the maintenance of the establishment and for carrying on all the operations of the Institution, leaving a balance of $13,718 63 to be further applied to the building.

In view of the great expenditure of the government on account of the war, the Institution did not at first claim, as it justly might have done, the payment of the annual income of the bequest in specie; but after the great loss sustained by the fire, the necessity could not be avoided of calling the attention of the Secretary of the Treasury to this subject. The claim, after consideration, was allowed, so far as related to the current income, but the question relative to the difference between the payment of the interest which had previously

accrued in currency or in coin has not been settled by the department. That the Institution is entitled to the benefit resulting from this difference was the unanimous opinion of the Board of Regents at their last session, and among them of Chief Justice Chase. This learned jurist has since stated, that when Secretary of the Treasury he had in several cases ordered the currency received by parties who after investigation were found justly entitled to be paid in coin, to be again returned into the treasury, and had directed payment to be made to them in specie nominally of the same amount.

It has been mentioned in the two preceding reports, that a part of the original bequest had been left in England as the principal of an annuity payable to the mother of Smithson's nephew. The annuitant having died, a power of attorney signed by Abraham Lincoln, President of the United States, was sent to Fladgate, Clarke & Finch, solicitors, in England, authorizing them to collect the money and pay it to the order of the Secretary of the Smithsonian Institution. The proceeds from this, deducting the expenses of collection, were £5,262 0*s*. 3*d*., which were temporarily deposited with George Peabody & Co., who not only transacted the business without charge, but allowed four per cent. interest on the money while it remained in their hands. The total amount of this residuary legacy received by the Institution, including the interest, £153 19*s*. 4*d*., was $26,210 63 in gold, which being sold at the current premium, (about 207,) yielded $54,165 38 in United States currency. This sum was invested in government bonds, bearing interest at 7 3-10 per cent., and deposited for safe-keeping with General Spinner, the Treasurer of the United States.

It was at first supposed that the interest on this fund could be immediately applied to the uses of the Institution, but upon a critical examination of the enactments of Congress in regard to the bequest, it was found by the Solicitor of the Treasury that the act of Congress of 1846 appropriated only that portion of the money which was then in the treasury, and made no provision for the disposition of the residuary legacy. The Secretary of the Institution was therefore called upon by Mr. Fessenden, Secretary of the Treasury, to deposit this fund to his order in the treasury of the United States until Congress should authorize the appropriation of it to the maintenance or use of the Institution.

The cost of the restoration of the building in fire-proof materials without changing the external appearance has, as formerly stated, been far greater than was anticipated. Whether the portion of the work yet to be executed will much exceed in cost that which has

already been completed, will depend upon the price of materials and of labor. The Institution may in time be able to finish this work without encroaching on its present capital, provided the Secretary of the Treasury shall recognize the inadequacy of the payments of interest which for three years were made in the depreciated currency of the time. If this allowance be not made, and no assistance be received from Congress, then, in order to secure the building and its contents from injury by the weather, the Institution will be obliged to sacrifice a portion of its extra fund, and to the extent of this forever diminish its power to "increase and diffuse knowledge among men."

I have always been opposed to asking appropriations from Congress for the maintenance of the Institution, believing that the government is called upon to do nothing further in its behalf than carefully to guard the original bequest, and see that it is faithfully applied in an efficient manner to the purposes intended by the donor. But the government, after having voluntarily accepted the trust, is bound in good faith to carry out the intentions of the testator, and to make up for any encroachments upon the funds which may have resulted from improvident or defective legislation. From abundant experience of at least the last fifteen years, it has been shown that the cost and maintenance of a building of the character which has been erected, so far from being necessary to the most efficient realization of the intentions of the founder, have been a constant source of extraneous expense, and have absorbed a large amount of money which ought to have been added to the active capital; and the question may now be asked with propriety, whether, since this building was erected by its own agents, in conformity with a law of Congress, an appropriation should not be made to restore it in fire-proof materials, and to devote it in whole or in part to purposes of the government. A single wing of the edifice is sufficient to carry on all the essential operations of the Institution, and the whole remaining part of the building might be applied to the national collections, which have been greatly enriched at the expense of the Institution, to the accommodation of the Army Medical Museum, or to the uses of the Agricultural Department.

Publications.—During the past year the general operations of the Institution have been continued with unabated energy, although, on account of the increased cost of paper and printing, the number of copies of publications distributed has not been so great as in some previous years. The papers, however, which have been printed are stereotyped, and all our domestic institutions will be supplied as soon as a reduction of prices or an increase of the income of the Institu-

tion shall warrant the expenditure for this purpose. The following is a list of the works in *quarto* published by the Smithsonian Institution in 1865 :

Discussion of the Magnetic and Meteorological Observations made at Girard College Observatory, Philadelphia, in 1840, 1841, 1842, 1843, 1844, and 1845. Fourth section comprising Parts X, XI, and XII. Dip and total force. By A. D. Bache, LL. D. Pp. 44. (Published January, 1865.)

Palæontology of the Upper Missouri: A report upon collections made principally by the expeditions under command of Lieutenant G. K. Warren, U. S. topographical engineers, in 1855 and 1856. Invertebrates. By F. B. Meek and F. V. Hayden, M. D. Part I. Pp. 156 and five plates. (Published April, 1865.)

Cretaceous Reptiles of the United States. By Joseph Leidy, M.D. Pp. 142 and twenty plates. (Published May, 1865.)

These memoirs, which have all been described in previous reports, combined with section third of Professor Bache's discussion and Dr. Draper's article on the construction of a silvered glass telescope, published in 1864, formed volume XIV of the "Contributions to Knowledge," (490 pp., 25 plates,) which was distributed in part during the past year.

Of other quarto works in press in 1865, the following are nearly ready for publication, and will constitute part of volume XV of the "Contributions:"

Astronomical, magnetic, tidal, and meteorological observations within the arctic circle, by Isaac I. Hayes, M. D., reduced and discussed by C. A. Schott, of the U. S. Coast Survey. 250 pp., with two charts and a number of diagrams.

Investigation of the Orbit of Neptune, with general tables of its motion. By Simon Newcomb, of the U. S. Naval Observatory. Pp. 116.

The memoirs actually completed and issued in the year therefore embraced 342 pp. and 25 plates, which, added to the 366 pp. stereotyped but not distributed, in the same period, makes an aggregate of 708 pp. and 25 plates in quarto as the record of the year.

The following works in *octavo* were also published or printed in 1865:

Instructions relative to Ethnology and Philology of America. Appendix A—physical characters of the Indian races ; Appendix B—numerical systems. By George Gibbs. Pp. 18. (Published May, 1865.)

Review of American Birds in the collection of the Smithsonian Institution. By S. F. Baird. Pp. 143–320 or 172 pp. (Published May, 1865.)

Researches upon the Hydrobiinæ and allied forms, chiefly made upon materials in the museum of the Smithsonian Institution. By Dr. W. Stimpson. Pp. 64. (Published August, 1865.)

In addition to the above, continuations of the following works were printed in 1865:

Catalogue of transactions of societies and scientific journals in the library of the Smithsonian Institution. 200 pp.

Continuation of Parts II and III, by Mr. Binney, of the Synopsis of the Land and Fresh Water Shells of the United States. About 60 pp.

These make a total of 514 pages, and, including the Annual Report of 1864, (450 pages,) an aggregate of 964 octavo pages ; and of all classes of publications, 1,672 pages.

Smithsonian Contributions.—The first paper which has been received for publication in the quarto series, and which has not yet been described, is that on the planet Neptune, by Professor Newcomb, of the National Observatory.

It will be recollected by those who are familiar with the history of the operations of the Institution, that shortly after the discovery of the planet Neptune, the first ephemeris of, or, in other words, a table for indicating, its position in the heavens at any time during the year was prepared and published at the expense of the Smithsonian fund. This ephemeris was computed from an orbit based on a remarkable discovery of Professor Sears C. Walker, then of the Washington Observatory. Beginning with observations of the movement of the planet during a period of four months, Mr. Walker traced its path among the stars through its whole revolution of 166 years, and was thus enabled to carry its position backward until it fell among a cluster of stars, each of which had been accurately mapped by the celebrated Lalande, near the close of the last century. From a critical scrutiny of these stars, Mr. Walker was led to conclude that one of this cluster observed by Lalande on the night of the 10th May, 1795, was the planet Neptune. Availing himself of this discovery, Mr. Walker had now a series of observations, embracing not merely a few months of the movement of the planet, but its entire motion during a period of fifty years. From these data he was enabled to deduce a perfect elliptical orbit, or one which the body would describe were

there no other planets in the system, and from this to calculate an ephemeris.

The motion of Neptune was further investigated by another of our countrymen, Professor Peirce, of Cambridge. He calculated the action of all the other planets on Neptune, and obtained results which enabled Mr. Walker to correct his elliptical orbit, and to compare the calculated places of the planet with its actual position in the heavens. This led to a further correction of the orbit, and to a more perfect table of calculated places. The Ephemeris was published annually for several years, until the establishment of the American Nautical Almanac, when, in accordance with the general policy of the Institution, it was transferred to that work.

During the last nineteen years, which have elapsed since the investigation of Professors Peirce and Walker relative to the orbit of this planet, a series of accurate observations have been made upon its motion at the principal observatories of the world, and these have now been discussed by Professor S. Newcomb, of the Washington Observatory, a young mathematician in whose progress and advancement this establishment has taken great interest.

The objects of Mr. Newcomb's investigations, as stated in the introduction of his memoir, are as follows:

1. To determine the elements of the orbit of Neptune with as much exactness as a series of observations extending through an arc of forty degrees will admit of.

2. To inquire whether the mass of Uranus can be deduced from the motions of Neptune.

3. To inquire whether these motions indicate the existence of an extra neptunian planet, or throw any light on the question of the existence of such a planet.

4. To construct general tables and formulæ, by which the place of Neptune may be found at any time, and more particularly between the years 1,600 and 2,000.

The work is divided into five chapters.

The first is introductory, giving a brief review of the previous labors of astronomers in perfecting the theory of Neptune. The only approximately correct theory which had been published is shown to be that of Professor Sears C. Walker and Professor Benjamin Peirce, whose labors were given to the world in the second and third volumes of the Smithsonian Contributions to Knowledge, and in the first volume of the Proceedings of the American Academy. The elements of this theory were, however, far from correct, owing to the insuffi-

ciency of the observations which had been made when the theory was constructed. On account of the extremely slow motion of Neptune, the errors of the observations would be multiplied several hundred times in the final elements of the orbit.

The second chapter contains the computation of the perturbations of Neptune arising from the attractions of the other planets. This was the most difficult and laborious part of the work, the difficulty being greatly increased by the circumstance that the attraction of Uranus causes the orbit to pass through a regular change of form in a cycle of about 4,300 years.

The third chapter gives a discussion of the meridian observations of Neptune, made at the observatories of Greenwich, Paris, Washington, Cambridge, Hamburg, and Albany.

In the fourth chapter, the positions of the planet given by the observations are compared with a provisional theory, for the purpose of correcting the elements, after which, supposing Neptune to be attracted only by the known planets, its motions, as observed during the nineteen years since its discovery, are compared with the results of the theory of gravitation, and the greatest difference between the theoretical and observed longitudes is less than a quarter of a second in space, a minuteness so inconsiderable that, if multiplied by 300 times, it would still be too small to be perceptible by the naked eye, and the discrepancy is as likely to be due to the errors of the observations themselves as to that of the assumption of no exterior planet.

It is therefore concluded that there is no evidence of any unknown cause influencing the motions of Neptune, and consequently no evidence of the existence of an extra neptunian planet. At the same time, this is only negative evidence; for supposing the extra planet to exist, centuries might be required for its attraction to exert any appreciable influence upon the motions of Neptune. For a similar reason there are no reliable data for correcting the mass of Uranus.

The fifth chapter is devoted to the tables, which are founded on the theory finally concluded upon, and will probably not be subject to errors of more than a very few seconds during the remainder of the present century.

The history of the planet Neptune in relation to the perfection of its orbit exhibit a series of facts alike creditable to the science of this country and the policy of the Smithsonian Institution.

The next paper for the "Contributions" is an exposition of the results of the discussion of the observations made during the expedition under the direction of Dr. I. I. Hayes in the arctic regions, by Chas. A. Schott, of the United States Coast Survey.

The expedition, during which these observations were made, was organized and principally equipped through the enterprise of Dr. Hayes, assisted by contributions of a number of liberal gentlemen interested in the advance of physical geography. The principal object of the enterprise was the extension of the explorations of Dr. E. K. Kane north of Baffin's Bay, and to make such observations as would add to our knowledge of the physical condition of the arctic regions. The expedition was mainly furnished with instruments by the Coast Survey and the Smithsonian Institution, and after its return the records of its observations in their rough state, or as they were made, were presented to the Institution for reduction and discussion.

It is scarcely necessary to mention that scientific truths are not generally immediately deduced from the simple observation of phenomena, but that these require in most cases corrections to free them from the effects of extraneous and other causes. Thus in observing the place of the moon or a planet, the position as given directly by the instrument must be corrected for refraction, for parallax and for instrumental errors. So with the observations of the barometer, a correction must be applied for the relative expansion of the mercury and of the brass case in which the glass tube is contained, and also for capillarity, and in many cases for the elevation of the instrument above the level of the sea.

After the observations have been submitted to the process of correction, to which the name of *reduction* has been applied, they are then in a condition for scientific analysis, or for what is technically called *discussion*. It seldom happens that any phenomenon is the result of a single approximate cause. In almost all cases the effect observed is the result of a series of concurring causes, and it is the object of the scientific inquirer, if possible, to ascertain the separate effect of each. For example, the height of the tide at a given place and time is due to the conjoint action of the sun and moon modified by the form and direction of the coast, to concurring or adverse tidal waves, and also to the direction of the wind. In a successful discussion each of these effects should be separately exhibited, and the amount of the several influences of each critically ascertained. Without such reduction and discussion the crude observations exhibit a mass of figures without apparent connexion, and give no indication of the relation of phenomena. Unfortunately the labor attending these processes is so great, and in many cases the skill required so unusual, that individual enterprise and ordinary attainment are in-

sufficient to accomplish the end, and on this account immense masses of physical observations are of little value to science. Even those made by Parry, Ross, and the other explorers in the arctic regions have not yet been subjected to the analytical processes by which all the interesting truths relative to the physical geography of the globe are to be deduced. It is in this line that the Smithsonian Institution has especially rendered good service in the way of advancing science. Of this fact the memoir in question, with those which the Institution has published relative to the observations made by the expedition under the direction of Dr. Kane, and that under Sir F. L. McClintock, and the discussion of the observations made at Girard College by Professor A. D. Bache, are obvious illustrations.

For investigations of this kind the Institution has been fortunate in obtaining the services of a computer so expert and sagacious as Mr. Schott, since few persons are to be found who combine the varied qualifications necessary to so difficult an undertaking.

The results of the observations made under the direction of Dr. Hayes are presented in four parts: the first relates to the astronomical and geodetic; the second, to the magnetic; the third, to the tidal; and the fourth, to the meteorological observations.

The first part contains all the geographical positions determined by the explorers, including a series of observations to ascertain the latitude and longitude of Port Foulke, the winter quarters of the expedition in 1860–'61; also a general survey of Kennedy channel, and a minute survey of Smith's straits. The memoir presents a table of eighteen geographical positions, all determined with astronomical accuracy, by means of which, and the help of angles and solar bearings, the outlines of a large map were traced. It is highly gratifying to find, says Mr. Schott, that a remarkable agreement exists with the prominent points observed during Kane's expedition, and, indeed, that the exploration of Dr. Hayes is truly an extension and verification of the labors of his predecessor in the same region.

Nor is this all; it is proper to state that a new sound was discovered, opening to the westward near Cape Sabine, and also that two points noticed by Kane and described as headlands were found to be parts of two islands at the entrance of a bay; also the shoreline of Whale sound was fully developed, as well as the whole of the western coast of Kennedy channel. All these results, with the positions of the glaciers, are exhibited on a general chart of the regions explored, and on a special chart of Smith's straits.

The agreement of the results of the observations under Dr. Hayes

and Dr. Kane is due to the fact that in both expeditions the greater portion of the observations were made by Mr. August Sonntag, well known to science by his previous labors in astronomy and physics. By his early death the expedition sustained a great loss, since through his aid still greater additions would have been made to our knowledge of the regions explored.

Included in the first part of the reductions is also an account of the pendulum observations, intended to furnish information as to the relative intensity of the force of gravity, and, consequently, of the figure of the earth. The pendulum used in these observations is a simple bar of brass, five feet seven three-fourth inches in length and one inch and four-tenths in breadth, and seven-tenths in thickness, weighing nearly twenty-two pounds. It is furnished with two steel knife-edges, placed at 14.2 inches from either end, so that it may be vibrated first with one end downward, and then with the other, affording in each position a series of independent observations. The direction of the face of the pendulum could also be reversed, by means of which the results of their regularities of the knife-edge could at least in part be eliminated.

For comparison of the observations which had been made in the arctic regions, a series was instituted, previous to the sailing of the expedition, with the same pendulum, at the Harvard Observatory, in Cambridge, by the late director, George P. Bond. The result obtained by the comparison indicates a smaller value for the polar depression of the earth than that deduced from all previous pendulum observations in the northern region. If combined with these, it will bring the resulting figure of the earth nearer to that previously deduced from the measurement of arcs of the meridian in various parts of the world.

The compression, as deduced by Mr. Schott from all the observations of the expedition under Dr. Hayes, is $\frac{1}{372}$ part of the polar radius. The excess of the number of vibrations in a day at Port Foulke, over the number made by the same pendulum in the same time at the Harvard Observatory, was $129\frac{1}{2}$. The observations were corrected for the height above the level of the sea, for the expansion of the metal on account of variation of temperature, and other deviations from a normal condition. It is highly desirable that the same pendulum be vibrated at several points on the eastern coast of the United States, as nearly as possible, under the same meridian as Port Foulke, in order to obtain a series of independent determinations of the curvature of the earth; and for this purpose the instrument has

been lent to the Coast Survey, to be vibrated at New York, Washington, and Key West. The observations at New York will afford the means of connecting the results of a similar kind in Europe and other parts of the Old World, through the series of observations made by General Sabine in that city in 1822–'23, at the old site of Columbia College.

The observations of part second, which relate to magnetism, are of two kinds, namely, differential and absolute; the first made at Port Foulke, between November and March, 1860–'61, on fifteen days, during each hour of the twenty-four, being intended to ascertain the diurnal variation of the magnetic needle. The results of these observations are presented in connexion with those of Dr. Kane, in the form of a curve in which the agreement is strikingly exhibited.

From both series it appears that the north end of the needle attains its greatest westerly deviation at one p. m.; its greatest easterly deflection, between two and three o'clock in the morning; its normal position, at seven in the morning, and at the same hour in the evening. From these additions to our knowledge of terrestrial magnetism we have been enabled to state the fact that when simultaneous observations are made at different places, the motions of the needle are found to be governed by the local time at each place. From this it has been inferred that the cause of the daily motion of the needle is connected with the diurnal motion of the sun. The one o'clock greatest western excursion is common to all localities in the northern magnetic hemisphere, and is the most constant feature of the daily motion of the needle.

The declination was determined at fourteen localities on the coast of Greenland, between latitudes 72 and 80. These have been discussed in combination with the observations of Dr. Kane, and the result is given on a magnetic chart of the vicinity of Smith's strait. The horizontal component of the magnetic intensity was determined at seven stations, and these, combined with those by Dr. Kane, are also represented on the same chart. The inclination or dip was observed at six localities, and were similarly combined with Kane's determination, and likewise exhibited on the same chart.

It is a remarkable fact that but three auroras of sufficient brilliancy to attract the attention of the observers were seen at Port Foulke during the winter of 1860–'61, though many were noticed during the same period in lower latitudes; and this fact is the more interesting since the position above mentioned is very nearly the centre of the auroral belt as marked out by Professor Loomis, and exhibited in the

appendix of the report for this year. Although the aurora is now known to be an electrical phenomenon, it is certain that its region of greatest activity is not the magnetic pole of the earth, but is in a zone of several degrees in breadth, including the geographical poles eccentrically; nevertheless, it is also clear that it is influenced in its motions by the magnetism of the globe.

The third part, which relates to tidal observations, consists of two series: the first were made during November and December, 1860; the second in June and July, 1861. In the first series the height of the tide was noted every half hour; in the second series it was observed at every ten minutes about the time of high and low water. The apparatus employed consisted of a rope to which a stone was attached at the lower end resting on the bottom and passing over a pulley attached to a movable weight at the other. The pulley was supported by a tripod standing over a hole in the ice at a short distance from the vessel, and the changes of the height of tide were indicated by the vertical motion of the smaller weight. Corrections were applied for the irregular stretching of the rope and also for the errors of the watch. From the records thus corrected, Mr. Schott has determined the height of the average sea level for each day, and has compared this with the moon's declination parallax, or distance from the earth, the atmospheric pressure, and the direction and force of the wind. It is found that a variation of between one and two inches in the height of the water is due to the changes in the moon's declination from zero to its maximum value; also that a rise of one inch in the mercury of the barometrical column is accompanied with a fall of nearly four inches in the level of the sea. The effect of the wind, though small, is apparent. With a northeast wind there was a depression, and with a southwest an elevation, of the level; one probably blowing the water into and the other out of the strait.

The general character of the tide at Port Foulke is similar to that at Van Rensselaer harbor, exhibiting two ebbs and two flows each lunar day, with considerable diurnal variation, producing at Port Foulke at certain times the character of a single daily tide—the two waves as it were running into each other. The establishment, or, in other words, the average lagging behind of the high water, after the passage of the moon across the meridian of the place, is here half an hour earlier than at Van Rensselaer harbor, which is distant 55 miles in a northeast direction. This indicates a motion in accordance with the general direction of the tidal wave, which in this region is not due to the direct attraction of the moon, but is derived from the great tidal wave of the Atlantic ocean.

The investigation of the half-monthly inequality, or of the effect of the action of the sun in modifying the effect of the moon in time as well as in height of tide, gave the following results: The range of the inequality in time is one hour and twenty-six minutes. The mean establishment of high water is found to be eleven hours thirteen minutes and eight-tenths, and that of low water seventeen hours nineteen and a half minutes. The range of the variation in the height of the water, due to the action of the sun and moon, is two feet and a half. The absolute average variation in the height of water at Port Foulke is 7.7 feet, while Dr. Kane found at Van Rensselaer harbor 7.9 feet as the variation at that place. The extreme fluctuation observed in the water level was 13.8 feet. The retardation or the difference between the theoretic and observed time of high water is comparatively small.

The effect of the greater or less distance of the moon or parallax on the half-monthly inequality shows that diminution of distance produces a decrease in the time of the lagging of the water, and that the range of the tide is increased by three-tenths of a foot for an increase of one minute of parallax. The action of the sun must evidently be relatively less, with an increase of the declination of the moon, and the amount of this is found from the discussion of the observations to be in height of the value of only a fraction of a foot, and in time but a few minutes.

The moon, as it is well known, produces two high tides, at nearly the same moment, on opposite sides of the earth, and these must vary in altitude and extent from day to day, with the change of position of the moon in the heavens. The difference of these two tides in time and height is called the diurnal inequality. Mr. Schott has made of this phenomenon a special graphical study, and has found that the diurnal variation in height is greater for high water than for low water—that is, two successive high waters differ from each other more than two successive low waters. The maximum variation in height is found at Port Foulke to be 3.8 feet, and only 2.4 in low water, while this variation entirely disappears about two days after the moon passes the equator. This is for the high water ; but for low water the disappearance does not take place until after a lapse of nearly ten days, and this fact is connected with a remarkable one relative to the magnitude of the variation. On the one hand, the less interval of time between two tides is accompanied in high water with a greater difference of height, while in low water a greater interval of time is connected with a smaller difference in the level of the two tides. The diurnal inequality is due to two waves, a

diurnal and a semi-diurnal, which are exhibited by a diagram and fully analyzed.

Next, the form of the tide was investigated, and found to occupy a longer time in rising than in falling, or, in other words, its posterior slope is more rapid than its anterior—the difference in time is thirteen minutes at Port Foulke, and fifteen at Van Rensselaer harbor.

Finally, an investigation is given of the velocity of the tide wave in passing up along Baffin's bay. From this it appears that the crest of high water occupies eight hours in passing from the southern cape of Greenland to Smith's strait, at the head of the bay. From these investigations the velocity of the wave in Davis's straits is 194 statute miles per hour, correspoding to an average depth of 418 fathoms. In Baffin's bay the velocity is 177 miles, corresponding to 349 fathoms. In Smith's strait the velocity is 157 miles per hour, corresponding to 277 fathoms of depth. It may be interesting to state, as one of the results, that the free tide-wave in Davis's strait and Baffin's bay is about 2,300 miles in length, and only $7\frac{1}{2}$ feet in height from hollow to crest.

These statements will serve to give some idea of the complex nature of the investigation of the phenomena of the tides, resulting not alone from the direct action of the moon and sun, but also modified by the superposition of the derived tide of the Atlantic, and by the influence of the configuration of the channels through which the waves are propagated.

Part fourth gives the observations and discussion of the meteorological investigations. It is divided into three divisions—temperatures, atmospheric pressures, and winds—with an appendix giving a record of the weather during the whole voyage, and miscellaneous remarks.

Port Foulke, the locality of the winter quarters, was in the vicinity of open polar water, which exercises a marked influence on the climate of the region. The comparative mildness of the station is illustrated by the fact that the simultaneous recorded observations at Port Foulke and Van Rensselaer harbor show that the temperature was 26 degrees lower at the latter than at the former place, though distant only 53 miles. The continuous records at Port Foulke extend over a period of eleven months, and were made at every other even hour, day and night, with a few exceptions, (as to the pressure,) during the whole time.

The expedition was provided with about two dozen thermometers, consisting of spirit, mercurial, and metallic, of which the index errors

were several times ascertained by immersion in buckets of ice-water, and by comparison among themselves in the air, at very low temperatures. From all the records of these observations a table of corrections was made out by taking the mean of the temperatures as indicated by the several thermometers. The result was found to indicate temperatures nearly corresponding with those given by standard No. 3, which had been previously selected as the most trustworthy of the series of instruments. All omissions in the records were supplied by the known methods of interpolation.

The first results obtained are those which relate to the annual fluctuations of temperature. From these it appears that the warmest day was the 15th of July, with a temperature of 41°.6 Fahr., and the coldest the 16th of February, with a temperature of —28°.

The mean annual temperature falls on the 22d of April and the 14th of November, and is +6°.06. It must be observed that this difference in the temperature of the two localities, as we have said before, is due to the open water, and reached its maximum on the 20th of March, 1861, when the thermometer stood 46½ degrees lower at Rensselaer harbor than at Port Foulke.

The diurnal fluctuation—that is, the difference between the warmest and coldest hour of the day—exhibits also a remarkable accordance at the two places, its amount being 3°.38 at Port Foulke and 3°.64 at the harbor. At Port Kennedy it is 4°.12. In the month of December the diurnal variation almost vanishes, there being a difference of only two-tenths of a degree between the highest and lowest hour of the twenty-four. It attains its maximum value in March, when it is 8°.9. The fact that this greatest effect of the day influence of the sun takes place in March, Mr. Schott is disposed to attribute to the great amount of vapor which formed at a later period and obscured the direct action of the sun. On the average for the whole year the temperature rises until 2½ p. m. and falls till 2½ a. m., and the average temperature of the day is reached at 8 o'clock morning and evening.

The dependence of the temperature on the phases of the moon was also attempted to be deduced, but the situation of Port Foulke relative to the disturbing influence of the open water of Smith's straits rendered the result unsatisfactory.

The relation of the temperature to the direction of the wind was next studied, and it was found that the northeast and east winds, or those which flow over Greenland, are the coldest, while those from the south, southeast, and southwest, or those which pass over ocean surfaces, are the warmer. The northeast wind always depresses,

while the southwest always increases the temperature, especially in the winter season. The most intense cold was experienced when the air was perfectly calm, and this appears to be the general rule in the arctic regions. The effect of the various winds on the whole is small, not exceeding an elevation or depression of more than a degree and a half from the mean.

The effect of the snow and rain on the temperature is far greater than that of the wind. On an average in winter, during every fall of snow, the temperature was elevated 8°.6, and in summer fell a degree and a half during a fall of snow or rain. The number of days in which snows fell was 94, those in which it rained were 15, during the whole period of eleven months.

The effect of clear and cloudy weather on the temperature is next considered, and from the result of 82 clear days in winter, it is found on an average $3\frac{1}{2}$ degrees below the normal temperature of these days. In summer, from the observations of 41 clear days, the temperature was higher eight-tenths of a degree. In winter, during 31 cloudy days, the temperature was seven degrees above the normal; and in summer, during 48 cloudy days, the temperature was 2°.1 lower than the normal.

From the foregoing it appears that a clear atmosphere produces opposite effects in summer and in winter, and this is, without doubt, due to the greater amount of vapor in the former than in the latter season. During a clear day in winter the air is almost entirely deprived of vapor, and radiation goes on with full energy, uncompensated by rays from the sun, except those which are very oblique; while in summer the more intense rays of the sun penetrate the vapor, while the less intense heat from the earth cannot escape through the aqueous stratum.

The last discussion relates to the direct heating power of the sun and the record of temperatures observed during the excursion to the extreme northern point reached. The temperature in the month of May, 1861, was ten degrees lower along the coast of Kennedy channel, indicating a colder climate as the explorer went north, but whether this would be the case during the other parts of the year remains yet to be verified.

The observations on atmospheric pressure are not as complete as those on the temperature, the observations between 10 p. m. and 6 a. m. being frequently wanting. All the readings were reduced to the temperature of 32° Fahrenheit.

The diurnal fluctuation as given by these observations, as well as

by those of Dr. Kane, is extremely small, scarcely exceeding one-hundredth of an inch. The maximum pressure occurs during the day at about 6½ p. m., and the minimum about 3 in the morning. These, however, agree generally with those indicated in other arctic localities.

At Port Foulke there is also a secondary maximum and minimum occurring at 8 and 10½ a. m. The annual monthly fluctuation of the barometer is fully twenty times greater than the diurnal variation. In spring there is a well-marked maximum pressure, and in the autumn an equally well-exhibited minimum.

It is found from all the observations that the mean atmospheric pressure of the mercurial column at the temperature of 32° is 29.83, which accords well with the observations of Kane and McClintock, and is considerably above the minimum pressure found in about 12 degrees lower latitude. The fluctuation was 1.8 inch—the highest, 30.74; the lowest, 28.93.

The effect of the direction of the wind on the barometer is that of a depression of .07 of an inch during the northeast, and an elevation of .04 during the southwest, and a similar elevation during the calms. The oscillations of the barometer during three storms are illustrated graphically, and an attempt is made to determine the elastic force of vapor, but the observations recorded were insufficient; the amount was very small, not exceeding .02 of an inch.

The direction of the wind was invariably recorded with reference to the true meridian, and its force estimated by an arbitrary scale between zero and ten. The general result was, that the quantity of the stream of air which passed over the place of observation in the course of a year was nearly 60,000 miles.

The resultant direction during the year is largely from the northeast. The relative frequency of the wind is given, the northeast being 47 per cent. of the whole, the southwest 17, and the calms 27 per cent. The average velocity of the wind was 19 miles per hour.

During the eleven months of the observations 25 storms were recorded, 19 from the northeast and 6 from the southwest.

Another paper presented for publication, also in the "Contributions," is an account of geological observations in China, Japan, and Mongolia, by Raphael Pumpelly, of New York. This paper was read before the National Academy of Sciences, and recommended by that association to the Smithsonian Institution for publication. In the summer of 1863 the author passed from Shanghai to Hunan and the boundary between Hupeh and Sz'chuen, and in the autumn and

winter and following spring from Peking through the mountains of western Chihli, and again from Peking, beyond the great wall of China, and westward on the plateaus along its southern edge to its 112th meridian, returning by a route south of the great wall. In the winter of 1864–'65 he went from Peking across the plateau of Central Asia to Siberia.

The almost total absence of observations of a geological character throughout this wide field, renders any information in regard to it of considerable interest. The facts stated are principally derived from the personal observations of the explorer, together with such information as could be obtained from Chinese works which treat of the geography of the empire, or bear upon its mineral productions. The principal results arrived at are as follows:

There is reason to believe that there exists throughout China an immense development of Devonian limestone, which rises to the surface in all the larger ridges, and attains in some places a thickness of over 10,000 feet. The formations beneath this limestone, as far as they were seen, are either granitic rock or metamorphic schist unconformably stratified as regards the limestone. Overlying the limestone there exists in almost every part of the country a great coal-bearing formation of sandstones, shales, conglomerates, &c., in nearly, if not quite, conformable stratification as regards the floor on which they rest. The fossil plants obtained from this formation are considered supra-carboniferous, and it is supposed that the coal fields of China, which vie with our own in extent, are referable to the Triassic period. Although from the limited range of actual observation it would be too much to assert that there is a total absence of any later formation than these coal measures, still the author failed to observe any traces of them.

Only two systems of elevations occur in China of sufficient importance to have left a marked impress on the surface. These are the northeast–southwest and east–west.

The northeast system determines the outline of Asia east of the 110th meridian, and coincides with the middle course of the Yangtse Kiang and the lower course of the Amur.

The east–west system exists in western China in the Min mountains and in the Nanling range, and determines the general course from west to east of the three principal rivers of the south of China.

The upheaval of the northeast system began after the deposition of the great Devonian limestone formation, and appears to have risen slightly during the formation of the coal measures, but its greatest elevation was after the latter had been deposited.

The east–west system appears to have risen later than the other, since it has elevated the limestone and overlying rocks which rest upon its sides. Evidences are presented of recent oscillations extending over great areas in the form of terraces.

In the great plain of northeastern China is a delta deposit extending over nearly eight degrees of latitude, which is yearly increasing in extent. Through this delta the Hwang Ho varies its course every few centuries, emptying into the sea alternately to the north and to the south of a mountainous peninsula, thus presenting the remarkable phenomenon of one of the great rivers of the earth not only shifting its course through several degrees of latitude, but also of returning to the same bed after the lapse of a number of years.

The great table-land which lies between China and Siberia, where the author crossed it, consists of basins of undisturbed strata of sandstone, containing beds of gypsum. In the south this table-land generally terminates in a precipitous wall, formed of an immense development of lava, in some places more than 1,500 feet thick.

The abrupt termination of the plateau is owing to a great dislocation which marks approximately the coast-line of a former ocean to the north, in which the most recent deposits of the plain originate, and along whose southern shore there existed an extensive region of volcanic activity. The plateau is terminated on the east by parallel ridges, which descend by successive terraces to the low land.

Among the more economical results obtained may be mentioned a large number of extensive coal basins and the deposits of other useful minerals, which are so widely distributed throughout the empire as to warrant the belief that China scarcely stands second to any other country in regard to the quantity and quality of its coal and its other mineral resources.

Such gifts of nature, says the author, combined as they are with a variety of favorable circumstances, cannot long be unappreciated. They are the elements of the civilization of the present age, and in the natural course of events the country possessing them cannot long avoid being drawn into the stream of industrial and intellectual progress.

Among the papers which have been offered for publication is a vocabulary and grammar of the Nootka Sound language, by the Rev. C. Knipe. This was the result of a residence of a year and a half among the tribes inhabiting that portion of the northwest coast of America. The same language extends southward to Cape Flattery, and is one upon which very little correct information has been ob-

tained. The present work contains lists of more than twelve hundred native words; with remarks on the genius of the language, and an account of roots, terminals, derivations, comparisons, &c. In the report of one of our collaborators, Mr. George Gibbs, to whom this memoir was referred, it is stated:

"The Nootka language is an exceedingly interesting one, not only as the earliest of those of Northwestern America with which we had any acquaintance, and which enters largely as an element into the 'jargon' of the coast, but also because the people who speak it in its various dialects form one of five great northern tribes of the Pacific, whose intelligence, courage, and ingenuity have rendered them conspicuous, and whose industrial arts and physiognomy have furnished an argument with many in favor of their Asiatic origin. The existing vocabularies of that language are very imperfect and meagre, and the more extended one of Mr. Knipe will be of great value to comparative philologists."

We had decided to put this production to press, when the author unexpectedly informed us that he was obliged to leave the country for England, and could not, therefore, give his personal attention to the work as it was passing through the press. As this was considered essential, it was thought better that he should withdraw his manuscript, and endeavor to procure its publication through some society in England. If he should fail in this, the Institution would at some future time undertake its publication, since it is intimately connected with other works of a similar character already given to the world through the agency of the bequest.

Another paper presented to the Institution for publication is by Mr. James G. Swan, upon the manners and customs of the Makah Indians of Washington Territory, a tribe belonging to the Takwaht or Nootka Sound family, illustrated with many drawings and accompanied by a vocabulary of their language. The size and cost of publication of this work has prevented us from considering its adoption at present as one of our series.

Miscellaneous Collections.—Under the class of publications called "Smithsonian Miscellaneous Collections," previous to the war, a series of manuals, intended to facilitate the study of different branches of natural history, were projected and a number of them actually commenced; but the subsequent diminution of our income, and the advance in the cost of materials and workmanship in the line of printing, has greatly interfered with the rapid completion of this enterprise. Of the works of this series as given in the report for 1860,

some have been completed, others are still under way, and one or two not yet commenced. The following is a statement of their present condition:

1. Land and Fresh Water Shells—part I. Terrestrial Pulmonata. By W. G. Binney. Of this work the manuscript is entirely completed and the woodcuts engraved.

2. Land and Fresh Water Shells—part II. Fresh Water and Marine Pulmonata. By W. G. Binney. The whole of this work has been stereotyped, and will soon be ready to be issued.

3. Land and Fresh Water Shells—part III. By W. G. Binney. Including all the water-breathing univalve shells except the Melaniadæ. This work has likewise been stereotyped, and is ready for publication.

4. Land and Fresh Water Shells—part IV. Melaniadæ. By G. W. Tryon. The manuscript of this has been completed and most of the woodcuts engraved.

5. Land and Fresh Water Shells—part V. Corbiculadæ. By Temple Prime. Of this the stereotype plates are almost completed.

6. Land and Fresh Water Shells—part VI. Unionidæ. A work by Mr. Lea, of Philadelphia, supersedes for the present any other publication on this subject.

7. Marine Shells—part I. From the eastern coast of North America, by Dr. W. Stimpson.

8. Marine Shells—part II. From the western coast of the same continent, by P. P. Carpenter. The last two works have been commenced and numerous woodcuts drawn or engraved to illustrate them; but no definite period can be fixed for their completion.

9. Bibliography of North American Conchology to the year 1860, by W. G. Binney, parts I and II. This work, which is a supplement to those previously mentioned, has been stereotyped and copies distributed to institutions.

Another work belonging to the octavo series, but not included in the above list, is the Review of American Birds in the Collections of the Smithsonian Institution—part I. Northern and Middle America. By Professor S. F. Baird.

This work is intended to present a descriptive account of the very large collection of American birds in charge of the Smithsonian Institution, with an enumeration of such other specimens as may serve to illustrate the geographical distribution of the several species. In 1858 Professor Baird prepared an account of the birds sent to the Institution by the different expeditions for surveying the railroad

routes to the Pacific, which was published in the series of reports ordered by Congress. To this was added an account of all the birds of the Atlantic States, and it thus formed a systematic and descriptive work on the ornithology of North America, which has since become the principal standard manual on this subject. A reprint by the Institution, from this volume, of the catalogue of species has been widely distributed and much used for labelling collections and preparing lists for distribution of specimens.

The number of specimens of birds of America in the collection of the Institution at the time the work was published, and upon which it was based, was less than 10,000; it now exceeds 40,000. Many portions of North America unexplored at that time—the whole arctic region, the recesses of the Rocky mountains, Cape St. Lucas, &c.—have since been investigated; the migration and distribution southward in winter of the species have been established by numerous collections from the West Indies, Mexico, Central and South America, and information generally has been collected, during the interval of seven years, which tends to complete the knowledge of the ornithology of North America. In this same period the specimens received from all parts of Mexico and Central America and the West Indies are so numerous as to represent nearly all the known species, and to embrace many new ones, forming, according to Professor Baird, an aggregate of species much larger than that of any other single collection.

In order, therefore, to bring up the subject to the present date, and at the same time to exhibit a connected account of the birds of Mexico, Central America, and the West Indies, Professor Baird undertook the work referred to, and 320 pages of it have thus far been published, each signature being dated, to show the time of actual issue. The portion printed embraces an account of the *oscine* or singing birds, with synoptical tables and detailed descriptions of the families, genera, and species, excepting where these have already appeared in the Pacific Railroad Report. As the account of each family is completed, the duplicate specimens are set aside for distribution to the principal museums at home and abroad as types of the "review."

The work of Professor Baird has met with much commendation from ornithological writers in this country and Europe. The editor of the London Ibis, a journal devoted exclusively to ornithology, remarks: "that it will be the book of authority on North American ornithology for a long time to come, there can be little doubt. The

immense series of specimens, whether only temporarily lent or deposited permanently, (but the latter out of all proportion to the former,) in the collection of the Smithsonian Institution, gives him an advantage, such as probably no other ornithologist of what country soever has at any time previously enjoyed; and the professor, as our readers need not be told, is not the man to neglect opportunities of this kind. We are almost inclined to regard this work as the precursor of a new era in natural history. Hitherto a zoologist has thought he has done very well if he has closely examined some half dozen specimens, presenting the different appearances depending upon age, sex, or the like, of one species. He will now find, from an inspection of Professor Baird's labors, that an acquaintance with a much larger number of individuals, especially from different localities, is requisite if he intends to advance his science. One result of this attention to increased material, if generally followed, we suspect will be the very desirable one of nullifying the species makers—species makers, of course we mean, in a bad sense, for there are no more useful men, if they will but keep their hobbies under command."

From the limited funds of the Institution and its plan of organization it cannot afford to support individuals while they are devoted exclusively to the advance of any branch of science; and were this to be done in one case, it might be demanded in many. But there can be no objection to an officer of the Institution availing himself of the materials which are gathered through its agency for prosecuting as an extra labor any investigation to which he may be inclined; provided that at the same time he faithfully discharges all the essential duties which pertain to his position. In the preparation of the work above mentioned every facility has been given to Professor Baird which the establishment could afford, and with this view special attention has been paid to the collection of specimens of ornithology, with the view that, after this work has been completed, similar attention will be given in succession to other branches of science.

Another paper in the Miscellaneous Collections is entitled Researches upon the Hydrobiinæ and allied forms, chiefly from materials in the collection of the Smithsonian Institution, by Dr. William Stimpson. This memoir gives the results of an investigation relative to the structure of a group of small and little known fresh-water Gasteropods, which Dr. Stimpson had undertaken to study with a view to their classification and arrangement in the museum of the Institution. Under the name of Gasteropods are included mollusks, with a distinct

head, and which generally have a flat foot, adapted to crawling, and are also usually provided with a univalve shell. The search for the affinities and relations of these animals led to an examination of the allied types inhabiting the sea and brackish water. The results of the investigation were a more exact definition of the family to which they belong, and the extension of it so as to include other forms previously scattered; also the establishment on anatomical bases of a number of subordinate groups or sub-families, and the suggestions as to many new genera distinguished by peculiarities in the structure of the soft parts as well as the shell. This memoir not only furnishes an interesting addition to descriptive natural history, but a method of investigation which may be advantageously applied to other families of the class.

Dr. Stimpson, who was the naturalist to the Northwest Pacific Exploring Expedition, under Commodore John Rodgers, is now in charge of the Museum of the Chicago Academy of Sciences. He has spent several years, while preparing his report on the collections of the expedition, in the building of the Institution, and, without salary from the Smithson fund, has rendered us essential service in the classification and naming of specimens.

The work on the Myriapoda of North America, by Dr. H. C. Wood, jr., mentioned in previous reports, was completed and was awaiting its turn for publication, when it was unfortunately destroyed by the fire. It was subsequently rewritten, and as our funds did not permit its being immediately put to press, it was, with the consent of the Institution, offered to and accepted by the American Philosophical Society, and printed in the thirteenth volume of its transactions. The wood-cuts (about sixty) which had been prepared for the work were lent to the society to facilitate the publication. These facts are stated in the memoir, and full credit given to the Smithsonian Institution for the aid thus rendered.

The close of the war having released Dr. John Le Conte from his medical duties in connexion with the army, he has resumed his labors in entomology, and has already written a considerable portion of his "List of North American Coleoptera," and the "Description of New Species," which will be published during 1866. When these works are completed, he will commence the second part of his classification of coleoptera.

Reports.—During the last three years the government printing office was so busied with the preparation of documents connected with the war that the Annual Report of the Institution was inciden-

tally delayed, but the report for 1864 was finished and distributed at an earlier period than had been possible for several previous years. The demand for these reports is every year increasing, and we learn from the members of both houses that no document printed by Congress is more frequently called for.

It is greatly to be regretted that the extra copies of all the volumes of the reports previous to 1863, which were stored in the rooms of the towers, were destroyed by the fire, and that we are therefore unable any longer to furnish complete sets or to supply missing volumes to various institutions and correspondents that have applied for them. The reports since 1861, inclusive, have been stereotyped, so that at any future time an edition of any of these volumes may be printed; but with the high price of paper and press-work, and with the heavy demands on the Institution, this is at present impracticable.

The report for 1864 contains in the appendix a eulogy of Delambre, the eminent astronomer, translated by C. A. Alexander, esq., and a continuation of the series of memoirs of distinguished members of the French Academy of Sciences; an essay on the velocity of light, by M. Delaunay, translated by Professor A. M. Mayer; an original compilation on ozone and antozone, made for the Institution by Dr. Charles M. Wetherill; translation of Jamin's essay on vegetation and the atmosphere; extract of a memoir on the preservation of copper and iron in salt water, by M. Becquerel, furnished by Admiral C. H. Davis, United States navy; translations of articles on the preservation of wood and caoutchouc and gutta-percha, from the German periodical "Aus der Natur;" an article on gun-cotton by Lieutenant Von Karolyi, with notes by Dr. B. F. Craig, of this city; a translation by Professor Ten Brook of a description of Pettenkofer's apparatus for testing the results of perspiration and respiration; a translation by the late Professor Hubbard, of the Naval Observatory, of Lamont's report on the solar eclipse of July 18, 1860; a report of the transactions of the Society of Physics and Natural History of Geneva, 1861 and 1862, translated by C. A. Alexander; a letter from F. Troyon on the crania Helvetica, with illustrations; a continuation of Plateau's researches on the figures of equilibrium of a liquid mass withdrawn from the action of gravity, with numerous illustrations; an original article on the artificial shell deposits in Monmouth county, New Jersey, and a continuation of Baegert's account of the aboriginal inhabitants of the California peninsula, translated by Professor Charles Rau; an article on the "intermixture of races," by George Gibbs; a lec-

ture on the first steps in the study of high antiquity in Europe, prepared for the Institution by A. Morlot, of Switzerland; the prize questions proposed by various scientific societies in Europe; a report on the French scientific exploration of Mexico; an account of a journey to the Youcan, by W. W. Kirby, of an exploration in Upper California, by John Feilner, of an exploration of Western Missouri, by Dr. P. R. Hoy, with tables of weights and measures and chemical equivalents.

From this list it will be seen that the articles in the appendix consist principally of translations from foreign scientific publications not generally accessible to readers in this country, and of original articles prepared especially for the Institution.

At an early period it had been proposed to establish a printing office in connexion with the Institution, and the experiment was eventually tried. The result, however, conclusively proved that the expense of keeping up an establishment of this kind was far greater than the cost of having the printing done elsewhere. The "Contributions" and "Miscellaneous Collections" have principally been printed by Mr. T. K. Collins, of Philadelphia, whose execution of the work has been highly satisfactory, and who has had at his disposal unusual facilities for performing the various kinds of printing required in our diversified series of publications.

In consideration of the high price of paper and printing, and in order that it might be always in our power to issue new editions of any of our works, it has been thought advisable for the last four years to stereotype all our publications, and, for the security of the plates, to store them in a fire-proof receptacle. In view of this latter object, application was made to the Academy of Natural Sciences of Philadelphia for the use of a portion of the extensive fire-proof basement of its building. This proposition was cordially acceded to by the curators of the academy; a separate room was set apart for our accommodation, and all the plates not in actual use by the printer are now deposited in an apartment entirely secure from fire, and under the exclusive control of the Institution. The favor thus conferred by the academy is an illustration of the friendly relations which exists between this Institution and other establishments for the advancement of knowledge; and I scarcely need say that special thanks, in behalf of the Board of Regents, have been given to the society for its liberality and kindness in this matter.

Ethnology.—As we have stated in previous reports, this has been a subject to which the Institution has given particular attention. In-

deed, it is one which especially commends itself to the science and literature of this country, since it is intimately connected with our history and politics. Unfortunately, however, the subject of races is one which involves questions as to their origin and characteristics which can scarcely be discussed at the present time with that dispassionate logic and strictness of induction which is necessary to the establishment of truth. Still, much can be done in the way of collecting and recording facts which may serve as the basis of future investigation. Some of these, such as those relative to the Indians, are rapidly passing into oblivion; and others, which regard the negro, require to be disentangled from much prejudice and misrepresentation. The peculiarities of these races should be critically examined and truthfully recorded; to do this is a duty we owe to science and humanity.

One of the most important clues we have to guide us in the labyrinth of ethnological research is language; and this is essentially the case with regard to the aboriginal races of this continent. The remains of their implements, and even their earthworks, may, in a considerable degree, be referred to the common wants and instincts of humanity, as in the use of the bow and arrow; but their language affords indications of affiliation or diversity not otherwise attainable. It has therefore been considered an important object to devise a system of general characters which would express to philologists in every part of the world identity of sounds. Unfortunately, however, though much labor has been expended on attempts to construct such a system, none has yet been presented which is entirely satisfactory, or has been generally adopted. Indeed, either from transmitted peculiarities or acquired habits, commencing with the instinctive use of the mother tongue, men of different languages apparently become incapable of accurately discriminating particular vocal sounds with which early usage has not familiarized them, and on this account a system of characters as a general alphabet which will give universal satisfaction is scarcely to be hoped for. We must therefore be content, at least for the present, to represent the sounds of the remains of the language of the red men of our continent in such characters as shall best serve to preserve their general features, with a view to future comparison and discussion. Such an alphabet has been adopted on the recommendation of Professor Whitney, of Yale College, and Mr. George Gibbs, of this city, to whom the subject was referred. It is accompanied by a vocabulary to be filled up with the equivalent words of the dialect under consideration, expressed in common letters,

the sounds of which are fixed by reference to well-known English words in which these letters occur. In this way an attempt is made to express the several sounds without confusing the inquirer with new characters or numerous marks.

That the number of dialects which exist on this continent should be great is not surprising, when we reflect on the condition of the people previous to the advent of the Europeans. They had, without doubt, for a long time occupied the soil, and had probably arrived at that condition as to numbers in which the struggle for life is carried on with the greatest intensity, and in which sufficient food from the chase can only be obtained by separation into small tribes, or even families; a condition in which various dialects of one prevailing language would necessarily be produced.

Instructions for researches relative to ethnology in general have been prepared by Geo. Gibbs, esq., and were published in 1863, and a large number of copies distributed to officers of the United States government and others, particularly to those residing in the western portion of the continent. During the past year an appendix to these instructions, together with blank forms for systematic records, has been prepared by the same author and published by the Institution. The instructions and blank forms which have been sent out have produced a valuable return in vocabularies, weapons, implements, dresses, and other illustrations of the arts, manners and customs, and mental advancement of the aboriginal races of this continent. The vocabularies received have been given in charge to Mr. Gibbs, to whom the Institution is largely indebted for months of labor gratuitously rendered.

It is proposed, as soon as the funds will permit, to publish a descriptive catalogue of all the ethnological specimens in the possession of the Institution. These include, beside those from different parts of this country, those collected by the United States Exploring Expedition under Captain (now Admiral) Wilkes, from the islands of the Pacific, the East Indies, Africa, China and Japan, and Central and South America. Such a catalogue, properly illustrated with wood-cut engravings, from photograph drawings, would be an acceptable addition to the literature of ethnology.

At the commencement of the war preparations were made by the Institution to obtain records of the physical characteristics of the soldiers composing the army of the United States, embracing a large number of measurements of different parts of the body, to ascertain the peculiarities of the different nationalities represented. This work

was afterwards prosecuted on a much more extended scale than was compatible with the means of the Institution by the Sanitary Commission, and the observations have since been discussed by Dr. B. A. Gould, of Cambridge, who has deduced from them a series of novel and interesting results, which were lately presented to the National Academy. It is proposed to extend similar measurements to the Indian tribes, and it is very desirable that the negro should be embraced in the same investigation. We have in this country at the present time a better opportunity to study the peculiarities of a number of races than is perhaps to be found in any other single portion of the earth, and the most casual observer cannot but be struck with the marked difference which exists between the Indian, the negro, and indeed between the descendants of the civilized inhabitants of different parts of Europe, thousands of whom are now flocking to our shores.

The stubborn self-reliance and impatience of control of the Indian are strikingly contrasted with the docility and imitative qualities of the negro. The inflexibility of the characteristics of the former, with the gradual changes and amelioration of the character of the latter in his association with the white man, are worthy of special attention.

It may be proper here to mention that we have received a communication from Dr. E. H. Davis, one of the authors of the first volume of Smithsonian Contributions, pointing out an error in Lubbock's account of Smithsonian publications on ethnology, copied from the Natural History Review, of London, in our report for 1862. In this article (page 322) the sculptured stone pipes found in the mounds are classed under the head of pottery. This error, says Dr. Davis, does injustice not only to American aboriginal art, but also misleads European ethnologists in regard to a series of sculptures pronounced by all who have seen them to be illustrations of the highest stage of art attained in the stone age of America. The same mistake is now reproduced in the publications of the Anthropological Society of London, and in Lubbock's Prehistoric Times. The fact is that the pipes described in the first volume of the Smithsonian Contributions were not of terra-cotta. None of this kind were found in the mounds, and but few anywhere in the country.

Intimately connected with ethnology and anthropology is archæology, or the study of remains of the ancient inhabitants of a country. To those who have paid any attention to the subject, it is well known that recently very interesting discoveries have been made of the remains of lacustrine villages in Switzerland, Italy, and Germany;

and also that memorials of the early inhabitants of the Scandinavian peninsula have been recognized in the extensive heaps of shells, mostly those of the oyster, which were for a long time considered as formations of the sea, but which have been shown by the Danish savans to be the accumulated household refuse of populations who lived in ages ascending beyond the records of history. The indications of the artificial origin of these accumulations consist in the total absence of stratification which always characterizes marine deposits, and in the fact that the rubbish contains rude flint implements, charcoal cinders, and the bones of various animals, some of which are, at present, extinct in the districts in which these mounds exist.

In our own country, besides the well-known Indian mounds constructed for special purposes, such as for sepulture and religious observances, and as monuments of events, there are found on various parts of the coast shell mounds, which, like those of Denmark, are composed of the refuse of the repasts of the aborigines, and which will undoubtedly reward the research of the archæologist with interesting facts in regard to the ancient inhabitants of the land we now inhabit. Among the first essays in this line are those of Mr. Charles Rau, of New York, published in the last report of this Institution. They relate to an examination of mounds of this kind on the shores of New Jersey. These indicate the places where the aborigines were accustomed to feast upon the spoils of the neighboring beach, remarkable for the abundance of oysters, clams, and other edible mollusks. The places selected for this purpose were at some distance inland, and sufficiently elevated to be out of reach of high tide. The direct evidence that these shell accumulations are of an artificial character consists in the presence of numerous fragments of pottery and stone implements.

In one of the heaps and in the adjacent fields Mr. Rau obtained more than 300 specimens of Indian manufacture, consisting of stone axes, arrows and spear points, flint knives, and many pieces of broken crockery. The axes are of greenstone, or of sandstone, of the usual shape, and encircled by a groove for the attachment of a handle. That the manufacture of arrow heads was carried on in this place is evident from the great number of flint chips and unfinished arrow heads which lie scattered among the shells. These places were probably camping grounds at certain seasons of the year. It is said that similar shell-beds occur on Long Island, where the shells are used for burning lime. They also exist in Georgia, on the coast of Mas-

sachusetts, in Newfoundland, and in California; and now that attention has been specially directed to the subject, they will probably be found and examined in various parts of this continent.

The occurrence of the Danish shell-heaps, whose history is merged in the twilight of civilization, and those of a similar character in America, show that the early condition of man is everywhere essentially the same, while the rude implements which are obtained from them indicate a similarity of wants and an identity of mental characteristics by which these wants are supplied.

The Institution has given special attention to the collection of specimens to illustrate the archæology of this country, and now possesses, with those procured by the Exploring Expedition under Captain Wilkes, those obtained from the various expeditions under the auspices of the Institution, and from the Hudson's Bay Company, a more valuable series than any to be found elsewhere in the United States. An effort will be made during the present year to properly arrange and fully display them for study. The comparison of the early savage implements in different countries is full of interest. We see from this that what is called the stone age is not a period of absolute time, but a stage of civilization, long past in one portion of the earth, while existing at present in another.

Meteorology.—It has been aptly said that man is a meteorologist by nature. He is placed in such a state of dependence upon the atmospheric elements, that to watch their vicissitudes and to endeavor to anticipate their changes become objects of paramount importance. Indeed the interest in this subject is so absolute that the common salutation among civilized nations is a meteorological wish, and the first introduction to conversation among strangers is a meteorological remark. Yet there is no circumstance which is remembered with so little exactness as the previous condition of the weather, even from week to week. In order that its fluctuations may be preserved as facts of experience, it is necessary that they should be continuously and accurately registered. Again, there is, perhaps, no branch of science relative to which so many observations have been made and so many records accumulated, and yet from which so few general principles have been deduced. This has arisen, first, from the real complexity of the phenomena, or, in other words, from the number of separate causes influencing the production of the ordinary results; second, from the improper methods which have been pursued in the investigation of the subject, and the amount of labor required in the reduction and discussion of the ob-

servations. Although the primary causes of the change of the weather are, on the one hand, the alternating inclination of the surface of the earth to the rays of the sun, by which its different parts are unequally heated in summer and in winter, and, on the other, the moisture which is elevated from the ocean in the warmer and precipitated upon the colder portions of the globe; yet the effects of these are so modified by the revolution of the earth on its axis, the condition and character of the different portions of its surface, and the topography of each country, that to strictly calculate the perturbations or predict the results of the simple laws of atmospheric equilibrium with that precision which is attainable in astronomy, will probably ever transcend the sagacity of the wisest, even when assisted by the highest mathematical analysis. But although such precision cannot be looked for, approximations may still be obtained of great importance in their practical bearing on the every-day business of life.

The greater part of all the observations which have been recorded until within a few years past has been without system or co-ordination. It is true that the peculiar climate of a given place may be determined by a long series of isolated observations, but such observations, however long continued, or industriously and accurately made, can give no adequate idea of the climate of a wide region, of the progress of atmospheric changes, nor can they furnish an approximation to the general laws of the recurrence of phenomena. For this purpose a system of observation must be established over widely extended regions within which simultaneous records are made and periodically transmitted to a central position, where, by proper reduction and discussion, such general conclusions may be reached as the materials are capable of yielding.

In discussing the records, the empirical method does not suffice. It is necessary that *a priori* assumptions should be provisionally adopted, not, however, at random, but chosen in strict accordance with well-established physical principles, and that these be finally adopted, rejected, or modified, as they are found to agree or disagree with the records. It is only by this method that the different causes which cooperate in the production of a series of complex phenomena can be discovered, as is illustrated in the history of astronomy, which, previous to the investigations of Kepler, consisted of an unintelligible mass of records of observations. But even with the application of the best possible process of discussion, the labor necessary to be expended on such large masses of figures, in order to deduce simple results, is

far beyond any individual effort, and can only be properly accomplished by governmental aid.

The importance of a combined system of meteorological observations extending over a large area, and the peculiar advantages presented by our country for this object, were early appreciated, and such a system was commenced in 1819, under the direction of Dr. Lovell, Surgeon General of the army. The stations embraced the principal military posts, from which reports were made at the end of each month as to the temperature, the pressure, and the moisture of the air, the amount of rain, the direction and force of the wind, the appearance of the sky, besides casual phenomena, such as the aurora, thunder-storms, shooting stars, &c. In 1825 a similar system, of more numerous stations in proportion to the area embraced, was established in the State of New York, the points of observations being the several academies, under the direction of the board of regents of the university, an establishment having charge of the higher institutions of learning in that State.

In 1837 the legislature of Pennsylvania made an appropriation of four thousand dollars for instruments, which were distributed to voluntary observers. This system was continued about ten years; that of New York has been kept up with more or less efficiency until the present time; while the army system was continued until the commencement of the war.

The lake system, established by the engineer department, under the superintendence of Captain (now General) Meade, consists of a line of stations, extending from the western part of Lake Superior to the eastern part of Lake Ontario, and has been efficiently continued for several years.

The Smithsonian meteorological system was commenced in 1849, and, with occasional aid in defraying the expenses, has continued in operation until the present period. It was, however, much diminished in efficiency during the war, since from the southern States no records were received, and many of the observers at the north were called to abandon such pursuits for military service in the field. The efforts of the institution in this line have been directed to supplementing and harmonizing all the other systems, preparing and distributing blank forms and instructions, calculating and publishing extensive tables for the reduction of observations, introducing standard instruments, and collecting all public documents, printed matter, and manuscript records bearing on the meteorology of the American continent, submitting these materials to scientific discussion, and publishing the results. In

these labors the Institution has been in continued harmonious co-operation with all the other efforts made in this country to advance meteorology, except those formerly conducted by the Navy Department under Lieutenant Maury. These were confined exclusively to the sea, and had no reference to those made at the same time on land. Without desiring to disparage the labors of Lieutenant Maury, I may say that his results would have lost nothing of their value by the adoption of a less exclusive policy on his part. The meteorology of the sea and that of the land pertain to a connected series of phenomena which can only be properly studied by a combined system of observations relating to both. The method pursued by Lieutenant Maury consisted in dividing the surface of a map of the ocean into squares of ten degrees on a side, and in recording within each of these the directions of the winds obtained from the log-books of the vessels which had traversed the several regions. In this way he accumulated a large amount of data, which, though published in connexion with many crude hypotheses, are of great value in the study of the meteorology of the globe.

In 1853 a meteorological system was commenced in Canada, the senior grammar school in each county being provided with instruments, and the observations have been continued to the present time. In regard to this system, Mr. Hodgins, of the educational department, remarks: "We have never lost sight of the great practical importance to a new and partially settled country, of establishing early in its history, before its physical condition is materially changed, a complete and comprehensive system of meteorological observations, by which may be tested theories of science which are yet unsettled, and which may be solved, relating to natural phenomena which have long remained among the sealed mysteries of nature."

The observations thus far have been taken without remuneration, but the importance of the system has become so well recognized that the Canadian government has decided to establish ten permanent stations, in addition to the observatories at Toronto and Kingston, distributed so as to afford the most complete information relative to the climatic features of the whole province. The points selected are Windsor, Goderich, Stratford, Simcoe, Barrie, Hamilton, Peterborough, Belleville, Pembroke, and Cornwall; that is, two stations on Lake Erie, one on Lake Huron, three on Lake Ontario, one on Lake Simcoe, one on the Ottawa river, one on the bay of Quinté, one on the St. Lawrence, near the eastern extremity of the province, and two in the interior of the country. The records made at the public schools of Canada have been furnished to the Smithsonian In-

stitution, as well as to the committee on immigration of the House of Assembly, for the purpose of furnishing facts relative to the climate, of importance to settlers, and recently the department of royal engineers has applied for the returns, with a view to the consideration of their bearing on questions of defence.

To secure a greater degree of responsibility, and to promote the efficiency of the system, the government has provided for the payment of fifty cents a day to the teachers of the grammar schools at the stations before enumerated, as remuneration for the service rendered.

Under the direction of the distinguished academician Kupfer, there is established over the vast Russian territory a network of thirty meteorological stations, where are noted the various changes of the atmosphere as to temperature, pressure, moisture, &c. The most northern of these stations is at Hammerfest, in 70° 41′ north latitude, 21° 26′ east longitude from Paris, and the most southern is at Tiflis, in 41° 42′ north latitude, and 42° 30′ east longitude. A similar system of simultaneous observations has been for several years in operation in Great Britain and Ireland, in connexion with the Board of Trade, and under the direction of the late Admiral Fitzroy. Other and like systems have been established in France, Italy, and Holland. From these different organizations, as well as from insulated observatories, telegrams of the weather are sent every morning, at seven o'clock, from the principal cities of Europe to Paris, where, under the superintendence of the celebrated Leverrier, they are discussed, and the results transmitted by mail to all parts of the world in the successive numbers of the daily International Bulletin. A similar publication is periodically made in Italy, under the direction of M. Matteucci, so well and favorably known by his discoveries in physics. The British government has also established a system of observations for the sea, and furnished its navy with accurate instruments, carefully compared with the standards of the Kew observatory. It is estimated in a report to Parliament that, through an annual appropriation of about fifty thousand dollars, statistics may be collected in fifteen years sufficient, with what has already been obtained, to determine the average movement of the winds on every part of the ocean.

From the great interest which has been awakened in regard to meteorology throughout the world, and the improved methods which have been adopted in its study, it can scarcely be doubted that in a few years the laws of the general movements of the atmosphere will be ascertained, and the causes of many phenomena of the weather, which have heretofore been regarded as little else than the capricious

and abnormal impulses of nature, will become adequately known; although, from the number of these causes, and the complexity of the resultant effect, it may never be possible to deduce accurate predictions as to the time and particular mode of their occurrence.

Indeed, the results which have been already derived from the series of combined observations in this country, fully justify the wisdom and forethought of those who were instrumental in establishing them. Although their organization was imperfect, the observers, in most cases, untrained, and the instruments of an inferior character, yet they have furnished data which, through the labors of Redfield, Espy, and Hare, whose memories are preserved in the history of science, have led to the establishment of principles of high theoretical interest, as well as of great practical value. Among these I need here mention only the fact now fully proved that all the meteorological phenomena of at least the middle and more northern portions of the temperate zone are transmitted from west to east. The passage of storms from one part of the country to the other was noticed by Dr. Franklin on the occasion of observing an eclipse of the moon. He showed that our northeast storms are felt successively later and later as the point of observation is further to the northeast; that they arrive last at the extreme northeastern portions of our continent. We now know, however, that the successive appearance of the storm at points further along the coast is due to the easterly movements, sideways as it were, of an atmospheric disturbance, greatly elongated north and south, and reaching sometimes from Canada to the Gulf of Mexico. Hence to persons residing along the seaboard the phenomenon would appear to have a northwardly progression, on account of the northeasterly trend of the coast; yet the storm not unfrequently reaches Bermuda simultaneously with Nova Scotia.

Few persons can have failed to observe the continued motion of the higher clouds from the west, or to have recognized the just meteoroscopy of Shakspeare in a well-known passage:

> "The weary sun hath made a golden set,
> And by the bright track of his fiery car
> Gives token of a goodly day to-morrow."

The breaking forth of the sun just before his setting shows that the rear of the cloud which has obscured his beams has, in its easterly course, reached our horizon, and will soon give place to an unobscured sky.

It must be observed, however, that all the storms which visit our coast are not of this nature; those denominated cyclones, and which seldom extend far into the interior, are probably of a rotatory character.

These usually commence in the Caribbean sea, move first toward the northwest, and gradually curving round before they reach our latitude, take an easterly direction, as has been shown by Redfield and others.

The first practical application which was attempted of the principle we have mentioned was made by this Institution in 1856; the information conveyed by telegraphic despatches in regard to the weather was daily exhibited by means of differently colored tokens, on a map of the United States, so as to show at one view the meteorological condition of the atmosphere over the whole country. At the same time publication of telegraphic despatches was made in the newspapers. The system, however, was necessarily discontinued at the beginning of the war, and has not yet been resumed. Similar applications have since been made in other countries, particularly in England, under the late Admiral Fitzroy; in France, under Leverrier; and still later, in Italy. In the last-mentioned country tabular statements are to be published annually, comparing the predictions with the weather actually experienced.

The British government has also recently introduced the system of telegraphic meteorological predictions into India. The cyclone of October, 1864, which did such damage to the shipping in Calcutta and destroyed the lives of sixty thousand persons, called special attention to the subject. The Asiatic Society of Bengal estimated the cost of such a system at 67,000 rupees, (about $30,000,) a sum which the government hesitated to appropriate, though it decided to furnish the necessary instruments and an allowance of fifty rupees a month to the assistant at the telegraph station at Saugor, on the seaboard to the southward of Calcutta, in the direction from which the most severe storms approach that port.

It must be evident, from what we have said in regard to the movement of storms, that a system of telegraphic meteorological predictions would be at once more reliable and of more benefit to the eastern coast of the United States, than those made in England and France, on the western coast of Europe, could possibly be to those countries, since the disturbances of the atmosphere which reach them advance from the ocean, while the majority of those of a similar nature which visit especially the middle and eastern portions of our coast, come overland from a westerly or southwesterly direction, and their approach may be telegraphed in some cases many hours before their actual arrival.

But the expense of the proper establishment of a system of this kind

can only be defrayed by the general government, or some organization in possession of more ample means than can be applied by the Smithsonian Institution to such a purpose. This will be evident from the fact which we have mentioned of the cost of the establishment of a similar system in India, and from a report of a committee of the two houses of Parliament appointed to consider certain questions relating to the meteorological department of the Board of Trade. From this it appears that the amount expended during the eleven years ending with 1865 was 45,000 pounds sterling, or an average of about $20,000 a year. The same committee recommend that meteorological observations at sea be continued under the direction of the hydrographic office of the admiralty, and an appropriation of £1,500 annually be made for instruments, and for discussion and publication of results, £1,700; making a total of £3,200. For weather statistics on land, the annual sum of £4,250, including instruments, discussion, and publications, is recommended, and for telegram storm warnings, £3,000; making a total annual expenditure of £7,450 for the land, and a grand annual total for land and sea of £10,450, or $52,250.

The present would appear to be a favorable time to urge upon Congress the importance of making provision for reorganizing all the meteorological observations of the United States under one combined plan, in which the records should be sent to a central depot for discussion and final publication. An appropriation of $50,000 annually for this purpose would tend not only to advance the material interest of the country, but also to increase its reputation. It would show that although the administration of our government is the expression of the popular volition, it is not limited in its operation merely to objects of instant or immediate utility, but that, with a wise prevision of the future, it withholds its assistance from no enterprise, however remote the results, which has for its end to advance the well-being of humanity.

It is scarcely necessary at this day to dwell on the advantages which result from such systems of combined observations as those which the principal governments of Europe have established and are now constantly extending. I may, however, in passing, briefly allude to some facts which may not at once occur to the mind of the general reader. They enable the mariner to shorten the time and diminish the danger of the passage from one port to another by indicating to him the route along which prevail, at a particular season of the year, the most favorable winds for his purpose. They also furnish the means

by which the sailor is taught the important lesson, which has saved thousands of lives and millions of property, namely, that of finding the direction of the centre of the cyclone, and of determining the course in which he must steer in order to extricate himself from the destructive violence of this fearful scourge of the ocean. To the agriculturist they indicate the character of the climate of the country, and enable him, with certainty, to select the articles of culture best adapted to the temperature and moisture of the region, and which, in the course of a number of years, will insure him the most profitable returns for his labor. They furnish the statistics of the occurrence of sterile years and of devastating storms, which may serve as the bases on which to found insurance institutions for protection against the failure of crops, and thus give to the husbandman the same certainty in his pursuits as that possessed by the merchant or the ship-owner. They may also afford warning of the approach of severe frosts and violent storms in time to guard, at least in some degree, against their injurious effects. To the physician, a knowledge of such results as can be obtained from an extended system of observations is of great importance, not only in regard to the immediate practice of his art, but also to the improvement of his science. The peculiar diseases of a region are principally dependent on its climate; an extreme variation of temperature in a large city is invariably attended with an increase of the number of deaths. The degree and variation of the moisture at different times and in different places have also a great influence on diseases, and the more the means of studying the connexion of these elements and the corresponding condition of the human body are multiplied, the more will the art and the science of medicine be improved. I may mention that scarcely a week passes at the Institution in which application is not made for meteorological information relative to different parts of this country, with the hope to improve the condition, if not restore the health, of some patient. The knowledge, however, which at present exists as to the connexion of climate and disease, particularly in relation to our own country, is, in comparison to what might be obtained, of little significance.

No other part of the world can at all compare with this country in the conditions most favorable to the advancement of meteorology, by means of a well-organized and properly sustained system of combined observations; such a system extending from east to west more than two thousand miles would embrace in its investigation all the phenomena of the great upper current of the return trade-wind, which,

continually flowing over us at a high elevation, carries most of the disturbances of the atmosphere eastward. It would also include the effects produced by the polar and equatorial currents as they contend for the mastery along the broad valley which stretches without interruption from the arctic circle to the Gulf of Mexico, and would settle with precision the influence of the great fresh-water lakes in ameliorating the climate of the adjacent regions. But above all, in a popular view, it would furnish the means more effectually than any other system of predicting the approach of storms and of giving the ships of our Atlantic coast due warning of the probability of danger.

Collections.—In the preceding reports an important distinction has been made between the collections of the Institution intended for the immediate advance and diffusion of a knowledge of natural history, and the museum intended for popular exhibition; while the former is in strict conformity with the catholic spirit of the bequest, and can be prosecuted in due relation to the various other branches of knowledge, having each an equal claim on the bounty of the fund, the latter is principally local in its character, and demands a perpetual outlay of a portion of the annual income, which tends continually to increase with the additions to the number of objects exhibited, and finally to absorb all the resources of the establishment. Although the museum has been principally restricted to the maintenance and exhibition of the articles of the exploring expeditions of the government, and to such type specimens as might serve to illustrate the publications of the Institution, yet its cost has exceeded that of all the active operations which have rendered the name of Smithson favorably known in every part of the civilized world. This statement will not be thought incorrect when it is considered that to its account may justly be charged the absorption of the annual interest of the money expended on the building, a sum which will now be greatly enhanced by the cost of the restoration.

I have thought it important to refer to this point in almost every annual report, in order that what I deem a fundamental policy of the Institution should be kept constantly in view, namely, the preservation of the income of the Smithsonian fund as untrammelled as possible, and free to be applied to assist in the solution of any scientific problem which may present itself, or in any other way to extend the present bounds of human knowledge. A well replenished purse, unincumbered with debt and free to be applied to any purpose, is a source of power as important to an establishment for the advance or diffusion of knowledge as it is to an individual.

By these remarks I do not intend to disparage the value of public museums; so far from this, I can freely say that I consider them of great importance as a means of intellectual improvement, of rational enjoyment, and as receptacles of interesting materials for the use of the student in any branch of learning. By the foregoing remarks I merely wish to urge the fact that an establishment of this kind, worthy of the seat of government of the United States, can only be supported by appropriations from Congress, and to express the opinion that so large an expenditure in the imperfect attempt to found a museum by means of the Smithson bequest will in time be abandoned, and the whole of the income devoted to the more cosmopolitan objects of the Institution.

In the last report a general account is given of what has been done by the Institution towards forming such collections, and during the past year this portion of the general operations has been carried on with unabated success. Although it might appear that the older settled portions of the country had been thoroughly laid under contribution, yet new questions are continually arising, and attention is devoted to less obvious features, as the subject of natural history is more minutely pursued. But still there are vast portions even of the United States which remain in a considerable degree unexplored. In the eastern portion the explorations in 1865, under the auspices of the Institution, have been chiefly confined to the collection of materials for the illustration of the work on North American Oology, in preparation by Dr. Brewer. In the west, the labors interrupted by the death of the lamented Captain Feilner have been resumed, under the direction of General Sully, in the neighborhood of Devil's lake, Dakota. From Idaho, collections made by Dr. Hitz have been received, and from Arizona the valuable series collected by Assistant Surgeon Coues. The latter consist of mammals, birds, reptiles, insects, and plants. Doctor Coues has also made minute notes on the habits and peculiarities of the animals of the region explored, and is now engaged upon a report of the results of his labors.

It has been frequently stated in previous reports that the Institution has entered into friendly relations with the officers of the Hudson's Bay Company, and, from the active co-operation which has taken place, large collections of interesting specimens relative to the natural history of the country, valuable meteorological observations, and ethnological records have been derived.

In March last the Institution received upwards of thirty large cases from this source, containing immense numbers of specimens illustra-

ting the flora, fauna, and the anthropology of these northern regions. For the larger portion of these collections we are specially indebted to Mr. R. R. Macfarlane of Fort Anderson.

The services of Governor Mactavish, in forwarding his own and other valuable notes which accompany the collections, were also of great importance, and, as in previous cases, the boxes were delivered by the Hudson's Bay Company at Fort Garry, after thousands of miles of transportation, free of charges.

The opportunity afforded of adding to the collections of the Institution by the expedition to connect the United States and Russia by a line of telegraphic communication, was too important to be neglected. The directors of the company engaged in this enterprise early called upon the Smithsonian Institution for information in regard to the contemplated route, and besides receiving maps and other data relative to the geography and climate of the country, Mr. Kennicott, who had spent several years under the auspices of the Institution in Arctic America, was warmly recommended to them as a person well qualified to assist in the undertaking. The company also received valuable suggestions as to the best line from Professor Baird, and, in return for these services, facilities have been afforded, under Colonel Bulkley, in charge of the expedition, for making collections in natural history, &c., on a liberal scale. A prominent position was given to Mr. Kennicott in the survey, and a number of assistants were selected from young men who had also been in training in this Institution; the notes and collections which may be made by them will be transmitted to Washington for discussion and the publication of such results as may be important in the advance of science.

The telegraph company not only afforded facilities for making the collections, but also contributed, as did the Chicago Academy of Sciences, to lessen the expense to the Smithsonian fund in the purchase of the necessary articles comprising the outfit of the naturalists of the expedition. The first set of duplicate specimens will properly belong to the Chicago Academy, and the remainder will be distributed in the manner best adapted to facilitate the researches of those who are engaged in the study of the special branches of science to which the specimens may pertain.

In the southern part of the continent, explorations have continued to be made. Colonel A. J. Grayson, who has previously been a contributor, has examined the islands off the coast of Mexico, and has discovered a number of new species of birds; also Mr. Charles

Laszlo and Dr. Sartorius, to whom we have been indebted for meteorological observations, have continued their contributions to the natural history of Mexico.

A scientific survey of the Isthmus of Yucatan has been undertaken by Governor Salazar y Ilarregui, and, on the recommendation of the Institution, Dr. Arthur Schott was engaged to superintend the natural history branch of operations; and the collections, of which many packages have already reached us, are all to be sent to this Institution for examination previous to the publication of an account of the results obtained.

Dr. H. Berendt has commenced, under the auspices of the Institution, an exploration of British Honduras and the interior of Guatemala. The outfit of physical instruments and apparatus, and supplies, for collections of natural history, were principally furnished from the Smithsonian fund, while the personal expenses were borne by a subscription of a number of gentlemen interested in the advance of science, and by the Academies of Natural Sciences of Philadelphia and Chicago.

The explorations in Costa Rica by Dr. Von Frantzius and Mr. Carmiol have continued to add large numbers of specimens to our collections, no region of America, according to Professor Baird, having yielded of late years so many new species of birds.

Valuable collections have been made by Mr. Holland, Captain Dow, Mr. Hicks, and Mr. Chapman, in Central America.

From South America collections have been received from Mr. Walter S. Church and Professor W. E. Nation, in Peru; Dr. Hering, from Paramaribo; Mr. De Lacerda, Mr. Goodwin, and the Natural History Museum of Rio, in Brazil. For the latter donation, made by order of the Emperor of Brazil, we are specially indebted to the kindness of Mr. Lisboa, former Brazilian minister to the United States.

Large collections have also been received from the West Indies, principally made by Mr. Charles Wright, Mr. N. H. Bishop, Dr. Gundlach, Mr. March, Professor G. N. Allen, Mr. Robert Swift, and Mr. George Latimer, the deficiencies in our series from this region having been largely supplied during the year.

In accordance with the policy of the Institution, collections are not generally requested from the Old World, except in certain cases where they are desired for comparison by those who are engaged in special investigations. We have, however, during the last year, received a series of the eggs and skins of the birds of Palestine, presented by Mr. Tristram.

Distribution and use of Specimens.—The policy of rendering the specimens as conducive as possible to the immediate promotion of science has been constantly observed, and for this purpose not only have new specimens been furnished to those engaged in original investigations, but the duplicates of such as have been examined have been made up into sets for distribution.

From the materials principally furnished by the Institution, Dr. Gill has prepared a synopsis of North American seals, about to be published by the Essex Institute of Massachusetts, and has continued the description of new species of fishes. He has also examined the skulls of Mammals in the collection, and among them has made the remarkable discovery of a peculiar generic type of tapirs, still living on the Isthmus of Panama, but which has escaped the notice of previous investigators.

Ample materials have also been furnished Professor Baird for the preparation of an additional part of his review of American birds, and the means have been furnished Dr. Bryant, Mr. Cassin, and Mr. Lawrence, for prosecuting their investigations in relation to ornithology. A large number of reptiles have been sent to Professor Cope, of Haverford College, Pennsylvania, including a series from Arizona and Central America; the new species will be described in the proceedings of the Philadelphia Academy of Natural Sciences, and a more elaborate monograph of the whole is to be presented for publication to the Institution. Dr. Brewer has been supplied with eggs and nests of birds, for the continuation of his work on North American Oology, the first part of which was published in the eleventh volume of Smithsonian Contributions.

In all cases where assistance is thus extended to individuals in the prosecution of their particular studies, there is an implied understanding that full credit shall be given to the Institution for the facilities afforded. This condition has generally been properly observed, although in some few cases the acknowledgment has not been quite so explicit as the benefits received would appear to demand.

So extended has become the field of modern science that division of labor is here as essential as in the mechanic arts, and a mastery of principles and details can only be the reward of attention concentrated on a few branches; as, therefore, the organization of this Institution does not contemplate the support of a corps of professors engaged in a comprehensive cultivation of science in all its branches, but would rather invite the aid and procure the collaboration of those who may be disposed to render gratuitous service for the furtherance and advance of knowledge for its own sake, many of the

specimens which are sent to us for identification, particularly those of a rare character, are forwarded for examination to persons at a distance. During the past year the insects received, as usual, have been placed in charge of the Entomological Society, of Philadelphia; the plants have been sent partly to Dr. Torrey, and partly to Dr. Gray, for study and arrangement. The minerals have been transmitted to the School of Mines of Columbia College, New York. In all cases the specimens are to be assorted and labelled, the most perfect suite to be returned to the Institution, and the remainder properly divided into sets for distribution.

References have also been made during the past year of questions in the line of natural history to Professor G. J. Brush, Isaac Lea, esq., Dr. Jos. Leidy, A. Agassiz, J. P. Lesley, Dr. Haldeman, Dr. Allen, Thos. Bland, W. G. Binney, G. W. Tryon, jr., Dr. W. Stimpson, Dr. J. Le Conte, S. H. Scudder, P. R. Uhler, W. H. Edwards, Edw. Norton, E. T. Cresson, and Dr. H. C. Wood, jr.

It is gratifying to be able to state that in no case has a favor of this kind been refused by any one qualified to render the desired service ; indeed the time and labor bestowed on the affairs of the Institution by its collaborators might well be a matter of surprise to those who are themselves scarcely influenced by other motives than the pursuit of gain. In this respect the liberalizing tendency of scientific studies is strikingly manifest.

In the winter of 1859–'60 Mr. P. P. Carpenter, a well known conchologist, who had been requested by the British Association for the Advance of Science to prepare a report on the shells of the northwest coast of America, visited Washington, and was requested to arrange and label the extensive collection of shells of the Smithsonian Institution, preparatory to the distribution of the duplicates. These consisted of the specimens collected by the United States Exploring Expedition, under Captain Wilkes, and other expeditions instituted by government, together with those collected by individuals under the direction of the Institution.

The work, however, proved far too extensive to be completed by Mr. Carpenter before his return home, and it was therefore concluded to send the collection to him in England, where he would have an opportunity of performing the work under the more favorable condition of comparison with the great collections of that country. The boxes were transported across the Atlantic gratuitously, through the kindness of Sir E. Cunard, passed through the English custom-house without search, and arrived safely at the Warrington Museum, of

which Mr. Carpenter was at the time one of the scientific curators.

"In one respect," says Mr. Carpenter, "it was fortunate for the future interests of American malacology that the work was undertaken at the time. It was part of the plan to duplicate, for American students, names in the celebrated Cumingian collection, the largest in the world, and containing the principal part of the types described and figured in the modern monographs. Mr. Cuming himself liberally and kindly undertook to compare the shells of the Institution with his own. This great and wearisome labor he performed gratuitously, in order that he might give a fair starting point to American students. The only expense was that of transportation and clerk-hire. Shortly after the completion of the work, Mr. Cuming died, to the irreparable loss of the students of malacology, to whom he was always ready to render assistance whenever the interests of science would be thereby advanced." "When the duplicates of the Smithsonian collection shall have been distributed to the schools, colleges, and museums of the American continent, and students not yet born shall be thereby enabled to make an accurate beginning in this interesting and useful branch of study, it is hoped that the name of Hugh Cuming will be remembered with grateful respect, as the man to whose incessant labors during a long life is due the gathering together of the largest series of known forms of shells, and to whom they owe the naming of the principal part of their collection."

Mr. Carpenter does not claim for the naming of these specimens entire freedom from error; the names given represent simply, neither more nor less, those in Mr. Cuming's cabinet, as identified by himself during the years 1861 to 1865, that is, the names of the more recent monographer, whether right or wrong. It is believed, however, that there is no other collection of shells on the continent of America of an equal number of species which can lay claim to even this moderate standard of accuracy.

The several objects to which Mr. Carpenter's attention was directed were as follows:

First. To make the permanent collection of the Institution as complete as possible by advantageous exchanges in England and elsewhere.

Second. To arrange the first-class duplicates of those which had a special scientific value for distribution to the establishments where they would be most generally useful.

Third. To make up the remaining specimens into series for distribution to colleges and other educational establishments.

Of the first-class series, the following distribution has been made, viz: Museum of Comparative Zoology, Cambridge; Academy of Sciences, Philadelphia; State Cabinet of Natural History, Albany; Geological Survey of Canada, Montreal; Academy of Natural Sciences, San Francisco. The specimens of these sets, as we have said before, are of great scientific value for original comparison in the way of determination of species, since they have been labelled after careful comparison by Mr. Carpenter and other authorities in conchology.

A very inadequate conception was at first entertained of the amount of labor which would be required to complete the assorting and labelling this part of the Smithsonian collection of natural history. It was thought that it might be completed in the course of a few months. Mr. Carpenter has, however, devoted to it about four years of continued labor. It must be observed at the same time that perhaps a considerable portion of this period was devoted to a completion of the series intended to be preserved in the Smithsonian museum.

The specimens examined by Mr. Carpenter have all been returned to the Institution, made up into sets, in accordance with the arrangement previously described. The number of these sets and of other collections of shells for distribution to colleges, academies, &c., is about 1,000, the whole including about 60,000 species and 250,000 specimens. Of these about one-fourth have been distributed.

According to the statement of Professor Baird, the whole number of specimens, including shells which have been distributed, amounts to upwards of 124,000, of which 19,000 have been presented to various establishments during the past year.

Museum.—As the public museum of the Institution occupied the portion of the building constructed of fire-proof materials, it escaped destruction by the fire; yet the smoke and water to which they were exposed caused some damage to the specimens, and much labor and expense were requisite to restore them to their proper appearance.

The museum has continued to be an object of interest to the citizens and visitors of Washington, and should the library of the Institution be transferred to the Capitol, space will be found in the cases of the west wing for increasing the number of articles placed upon exhibition. Among the collections we have a large number of specimens to illustrate ethnology. In addition to those collected by the Exploring Expedition under Captain Wilkes, are all those which

have been obtained in the various explorations across the continent; from the Hudson's Bay Company; from the region of Nootka sound, Mexico, Central and South America. We regret that on account of the additional labor required in the renovation of the museum, and for want of space, these interesting collections have not yet been fully arranged and labelled for exhibition.

We may add, in this connexion, that if Congress shall adopt the proposition now under consideration to take charge of the library, we shall entertain the hope that it will in due time make provision for the establishment and care of a museum worthy the government of the United States, and thus relieve the Smithsonian fund of a burden to which, in strict accordance with what I have always conceived to be the proper interpretation of the will of the founder, it ought not to be subjected.

In the report for 1863 mention is made of the presentation of a large and remarkable meteorite to this Institution, to which the name had been assigned in California of the "Ainsa" meteorite. Acknowledgments were duly made to Dr. J. D. Irwin, surgeon United States army, for his services in behalf of the Institution in procuring this interesting specimen; but from additional facts which have come to our knowledge we are induced to add the name of this gentleman to the specimen, and to label it the "Irwin-Ainsa meteorite."

For an account of the work done in the museum, a complete list of donors to the museum and collections since the commencement of the Institution, I would refer to the annexed statement of Professor Baird.

Laboratory and experiments.—The conflagration which destroyed the cabinet of apparatus of physics did not extend to the chemical laboratory, and consequently the operations connected with the latter have not been interrupted. The series of experiments which were mentioned in the last report in relation to the examination of the air of the Capitol has been continued by Dr. C. M. Wetherill, and a very elaborate report prepared on the subject to be submitted to the Secretary of the Interior. This report not only gives the result of the observations made in the halls of Congress, and the experiments at this Institution, but also a synopsis of all the authentic facts from the bibliography of the subject, which it is believed will be considered of value to those who are practically engaged in those departments of mechanical construction which require attention to temperature and ventilation. From the investigations it appears that there is an abundant supply of fresh air forced into the chambers of the Capitol, but that in winter this is greatly deficient in the quantity of moisture.

necessary to form a comfortable and salubrious atmosphere. It must be evident that if in an isolated space in winter we desire to have air of the same salubrity and temperature as in an open space in pleasant weather in summer, we must artificially impart to this air not only the same degree of heat, but also an equal amount of moisture.

In an atmosphere entirely devoid of moisture the human body exhales with great energy from every pore of the skin, and especially from the lungs, and all the more delicate parts of the mucous membrane. Such an exhalation of moisture in the ordinary condition of the body would be far too great to allow of a healthy equilibrium between the natural excretion and assimilation, and it is with prevision, derived from long experience, that the savage anoints his body when exposed to an atmosphere rendered arid by refrigeration, to prevent excessive exhalation. The tendency of vapor to exhale from the body diminishes with the force of vapor already in the surrounding atmosphere, and a perfect equilibrium can only take place with air entirely saturated, at a temperature of 98°. But at the temperature of zero almost all the moisture of the atmosphere is condensed, and hence the tendency of the body in the open air in winter to give off its vapor would be excessive, were it not for the condensation of the vapor immediately around the body and retained in the interstices of the clothing. If, however, the surrounding air, without additional moisture, be heated to 70°, all obstruction to evaporation is removed, and excessive exhalation is the consequence. Beside this the equalization of the temperature is much more perfectly effected in case of air properly supplied with moisture.

These considerations, we think, are very much neglected in the processes which are adopted for warming and ventilating in this country. At least in the public buildings in the city of Washington, the means of supplying an adequate amount of moisture have not been provided, or, if provided, are not habitually employed. It is intended, however, during next winter, to continue the observations in regard to this matter, and to extend them to the principal public buildings connected with the government.

It has been mentioned in previous reports that a series of experiments was made in regard to the physical qualities and economical values of different kinds of illuminating materials for light-house purposes. Unfortunately all the notes of the experiments which had been made on this subject were destroyed in the fire, and during the past year the principal portion of time which I could spare from

other duties was devoted to the reproduction and extension of the results previously obtained.

During the past year I devoted about three weeks, in connexion with Commodore Powell and Mr. Lederle, of the light-house service, to investigations in relation to sound as applicable to fog signals, and obtained results of sufficient practical value to determine with considerable precision the policy of the Light-house Board in regard to this branch of aids to navigation.

As usual, various questions have been referred to the Institution by different departments of the government for solution, and these have in all cases received proper attention, and such reports have been made as would suffice to an intelligent decision in regard to them.

The Institution is constantly applied to for the examination and analysis of specimens of ores. Where such examination requires no special labor, the information has been gratuitously given; but where quantitative analysis is desired, and the information is for the advancement of private interests, a charge is always made sufficient to repay the actual cost of the investigation

Exchanges.—The system of international scientific and literary exchanges has been maintained and extended by the Institution during the past year. Seventy-seven large boxes, containing 1,176 parcels, were sent to our foreign agents in 1865, and 60 boxes, containing 5,000 parcels, received from them.

These packages, as in former years, contain the publications of the Institution, public documents, transactions of societies, and scientific works, by individuals, besides specimens of natural history. The cost of this branch of the general operations is very large, and would indeed far exceed the means of the Institution were it not for the liberal aid received from various parties interested in the advance of science. For favors of this kind thanks continue to be due to the Bremen, the Hamburg, the Cunard, and the Pacific steamship lines, and to the Panama Railroad Company; all these have generously transported the packages of the Institution free of cost. Acknowledgments are due to the Adams, Harnden, and Wells & Fargo express lines for the carriage without charge of smaller packages, and of larger ones at a very reduced rate. To Sir E. Cunard, F. Probst & Co., Oelrichs & Co., and Kunhardt & Co., of New York, and to Leffman & Gutheil, of Vera Cruz, thanks have been tendered for important privileges granted by them or through their influence. Mr. George Hillier, of New York, and Mr. Samuel Hubbard, of San Francisco, agents of the Institution in those cities, have continued their valuable services.

It may be proper to state that great care is exercised in the

tions have been given to our agents to transmit nothing in the boxes to the Institution which is not a donation, all purchases being excluded on account of the present tariff regulations.

For the statistics of the exchanges see the annexed tables in the report of Professor Baird.

Library.—The library has received during the past year, through our system of exchanges, 547 octavo, 201 quarto, and 19 folio volumes, 3,256 pamphlets and parts of volumes, and 183 maps and charts, making a total of 4,206.

The work on the catalogue of transactions of learned societies and of scientific journals has advanced so far that all those of foreign countries have been finished, while those of America are now in the hands of the printer.

The suggestion has been made in previous reports that considerable relief might be afforded to the Institution by the transfer of its library, under certain conditions, to the new and spacious halls which Congress is providing for its own library, and the importance of the proposition has been much enhanced by considerations connected with the recent disaster. The west wing of the building, in which the library is now contained, is not fire-proof, and is already filled to overflowing. To provide another depository for it, which shall render it entirely secure from fire and be sufficient for its continued increase, will far exceed the means of the Institution, and, although some inconvenience would be experienced in regard to ready access to the books, yet, in consideration of the great value of the collection, by far the most perfect of its kind in the United States, it has been thought proper to ask Congress to allow the deposit of this library to be made in one of the new fire-proof rooms preparing for the extension of its own collection of books.

I am informed by Mr. Spofford, the librarian of Congress, that these two new rooms will be sufficient to accommodate the Smithsonian library and to furnish space for the growth of the Congressional library for the next fifteen or twenty years. The object of the transfer is, of course, not to separate this unique and highly prized collection of books from its relations to the Smithsonian Institution, for it must still bear its name and be subject to its control, but merely to deposit it where its preservation will be more certain and its usefulness more extended.*

* Since the preparation of this report an act of Congress has been passed authorizing the deposit of the library in one of the new rooms of the Capitol. This arrangement, while it secures the safety of the books, will facilitate the researches of the student, since, in the same suite of apartments, he will have free access to two libraries. (See Proceedings of the Board in this volume.)

"*Personnel" of the Institution.*—In the annual reports for a number of years past no other account has been given of the *personnel of* the Institution than a reference to the principal assistants or a casual allusion to the others; but as special inquiry on this point has been made by some of the new Regents, and as some changes will probably take place on account of the fire and the transfer of the library, it is deemed advisable on this occasion to give the official position and the duty of the several persons connected with the establishment. This information is perhaps the more necessary in order to prevent misapprehension, and in some cases to protect the public from the representations of designing persons, who, though never having had any connexion with the Institution, or only a very temporary or subordinate one, have assumed to belong to the corps of its officers.

The act of Congress which organized the Institution directed the appointment of but one executive officer, who, under the name of the Secretary, should have "charge of the building and property of said Institution," be keeper of the museum, and perform the duties of librarian, thus confiding to him the general direction of affairs, under the control of the Board of Regents, and investing him with the sole responsibility for the judicious and the efficient conduct of all transactions of the Institution within the prescribed conditions. In order, however, better to enable him properly to discharge the important and arduous duties devolved upon him, he is allowed, with the consent of the board, "to employ assistants." By the adoption of such an arrangement it was no doubt intended to secure unity of action and efficiency of co-operation among all who might be actually engaged in carrying out the novel and interesting objects of the bequest. The importance of this provision of the law was, however, either not apparent at first or was lost sight of in the early proceedings of the board. The Secretary, instead of being allowed the selection of assistants upon his own judgment and responsibility, when permission had once been obtained for making the appointments, was required to submit his choice to the approval of the Regents, and thus, in a considerable degree, to abridge his power of control. As might have been anticipated, this deviation from the original intention of the act did not succeed in practice; dissensions soon arose as to the exact apportionment of the income by the Secretary to the several objects of the programme, in which the superintending parties were differently interested, as well as in regard to the direction which each assistant might exercise as head of a department, and maintaining a separate and independent direction and official correspondence. To

obviate these difficulties, and to determine for himself and his successors the character of his official position, the Secretary was constrained to resort to a rightful exertion of his authority, as plainly expressed in the law, and, without an appeal to the board, to reorganize his corps of assistants. The majority of the Regents fully approved of this course, and, to prevent difficulty in the future, repealed the regulation relative to the division of the income, adopting at the same time a resolution offered by the late Judge Douglas, that no official letter or communication pertaining to the affairs of the Institution should be written except under the authority and by the direction of the Secretary. Under this arrangment, which has now been in operation twelve years, all the affairs of the Institution have been conducted with harmony, and, as I venture to think, with an efficiency which evinces the wisdom of the provision for securing conformity of purpose and unity of action.

In the reorganization of the personnel of the establishment, the Secretary employed as his first assistant Professor Spencer F. Baird, and as chief clerk William J. Rhees, each of whom receives a permanent salary, affixed by a resolution of the Board of Regents to their respective offices. Other assistants are employed on such terms as the Secretary may think just.

It is evident, from the plan of organization, that the duty required of the assistants is of a clerical rather than a scientific character, since service of the latter kind, as has been fully shown, can always be obtained from the collaborators without charge, or from experts employed for the occasion and paid in proportion to the time of engagment. Although the terms of the reappointment of Professor Baird prescribe that he shall render assistance in any line of duty in which the Secretary may require his aid, yet on account of his zeal in the cultivation of natural history, and his skill and experience in the collection and arrangement of specimens, his labors have principally been assigned to such objects. He has likewise had charge of the business of exchanges, and in part also of the printing and correspondence. To Mr. Rhees has been assigned the duty of superintending the accounts and auditing all the bills of expenditures made by the Secretary and authorized under the general appropriation of the Regents, while he has at the same time acted as paymaster and assisted in the official correspondence.

Another assistant, Mr. William Q. Force, of this city, who has been for several years connected with the Institution, has charge of the meteorological materials which are constantly accumulating,

and of the preparation of the monthly account of the weather for publication in the bulletins of the Agricultural Department; one half of his salary is paid by the Commissioner of Agriculture and the other half from the Smithson fund.

An assistant is also required to attend to the care of the books in the library, and another to prepare the catalogue of the transactions of learned societies now in the press, and to perform the clerical duties connected with the system of foreign exchange. The former service for the last few years has been rendered by Dr. Theodore Gill, who, at the same time, has continued his investigations in regard to zoology. The latter duty has been performed by Miss Jane Turner, the sister of the lamented Professor Turner, whose name occurs so frequently in the previous reports of the Institution.

As one of the maxims to be observed in the policy of the Institution, but few persons are to be permanently supported by its funds. This maxim has been strictly observed in regard to the principal assistants, but it must be evident that, in the case of so large a building and its contents, and so many and various operations to be attended to, a number of employés will be constantly required. The connexion of these, however, with the Institution is considered of a temporary character, their numbers being increased or diminished as circumstances may indicate. Of this class the following is an enumeration of those employed before the fire. The number has since been reduced:

1. A janitor, who resides in the building, on the grounds, gives information to visitors, acts as messenger, and has a general care of the property at all times. 2. A curator of the museum, who keeps the specimens in a proper condition for exhibition, performs the work of a taxidermist in setting up specimens of birds, mammals, and other animals. 3. A machinist, who assists in preparing experiments for the illustration of lectures or for original research, who has charge of the apparatus, the gas and water pipes, the furnaces, and the repairs of the metal parts of the building. 4. A carpenter, to make cases, trays, packing boxes, furniture, and to attend to the repairs constantly required for the building. It has been found from experience that the salaries of the last two employés are much less than the annual cost of repairs of carpentry and metal work by the employment of outside parties. 5. Night watchmen. Previous to the fire but one of these was employed, but it was found that the service was too much for the health of an ordinary individual, and consequently it has been necessary to employ another, the whole

twenty-four hours being nearly divided between them. 6. Laborers, daily required for cleaning the building after the hours in which it is open to the public, attending to fires, &c.

Besides the assistants who receive a salary, a large amount of labor has been given the Institution, without pay, by persons interested in the study of natural history, or who have been engaged in explorations and make use of the facilities afforded by the library and collections in preparing their reports. To most of these, rooms, warmed and lighted, have been assigned in the building, and lodging apartments in the towers. Among these we may mention the names of Mr. F. B. Meek, Dr. W. Stimpson, Dr. Gill, Mr. R. Kennicott, Dr. E. Coues, Dr. H. Allen, Dr. E. D. Cope, and Mr. A. D. Brown.

The laboratory has been under the care, for the last few years, of Dr. B. F. Craig, now of the medical department of the army, and also of Dr. Wetherill, just appointed Professor of Chemistry in the new college at Bethlehem, Pennsylvania. The remuneration they received was either from the government or from private parties, on account of researches principally of an economical character.

For the purpose of conducting the foreign exchanges, it has been found necessary to have agents in such central positions as may enable us to distribute the books and specimens most effectually to various parts of the world, and to collect the returns intended for this country. The following are the agents at present employed: Dr. Felix Flugel, Leipsic; Gustave Bossange, Paris; William Wesley, London; Fred. Muller, Amsterdam.

The collaborators, to whom references have so frequently been made, include all the prominent cultivators of original science in this country. They have all, with scarcely an exception, rendered assistance in supporting, directing, and advancing the Institution. Its opponents have been mainly those who have been misinformed as to its character and labors, or have been disappointed in the desire to advance personal interests through its means.

Respectfully submitted.

JOSEPH HENRY,
Secretary Smithsonian Institution.

JANUARY, 1866.

REPORT

OF THE

SECRETARY, PROFESSOR HENRY, FOR 1866.

GENTLEMEN: It again becomes my duty to present to your honorable board the history of another year of the Institution founded on the bequest of James Smithson, and intrusted by the Congress of the United States to your care. In presenting the following account of the events of the year 1866 I am gratified in being able to state that the fire which occurred at the beginning of the previous year, and which, at the time, appeared so disastrous, has, in reality, led to the adoption of measures for the increase and better security of the funds, and of changes of importance to the future efficiency of the means of carrying out the intentions of the benevolent testator.

It will be seen by the report of the executive committee that, by judicious investments and the sale of coin received from England as the residuary legacy of Smithson, as well as that of the annual interest from the United States, not only have the operations of the Institution been maintained, and the reconstruction of the building carried on without any aid from government, but the finances have been improved and are now in a better condition than at any former period. If the petition to Congress to permit additions to be made to the principal on the same terms as those on which the original bequest was received into the treasury of the United States be granted,* then the extra fund, at the present market value of the stocks in which it is invested, will be sufficient to increase the endowment from $515,169 to $650,000, and still leave enough to complete the general restoration of the building, provided the cost of the restoration be limited to $150,000. For these results the Institution is much indebted to the personal exertions and influence of the Chancellor, Chief Justice Chase, to whom constant reference has been had during the past year in the management of the finances of the establishment.

Although the present condition of the fund is a matter of congratulation, yet there is another fact belonging to the history of 1866 of

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* Congress passed an act February 8, 1867, in accordance with the above, allowing the Regents to increase the capital by savings, donations, and otherwise, to a million dollars.

equal if not greater importance, in regard to the future efficiency of the Institution. I allude to the transfer of the Smithson library for safe-keeping and support to the library of Congress. To those who have not fully considered the subject, it might, at first sight, appear that this transfer of a large number of rare and valuable books from the building of the Institution would be attended with serious inconveniences, and be a virtual relinquishment of the control of property procured at the expense of the Smithsonian fund. But it will be evident, on a statement of the facts, that the advantages accruing to the Institution and the public from the transfer far outweigh any inconvenience which may arise on account of it; and that it will tend to increase the efficiency of the funds, while it adds to the security and even facilitates the general use of the library.

Although the removal of the books renders them somewhat less accessible to those engaged in study and researches at the Institution, yet all the current transactions of the scientific Societies of the world, which constitute the principal part of the library, will be still received at the Institution. An opportunity will thus be afforded of noting their contents before they are sent to the Capitol, and such books will permanently be retained as are of most constant reference. In addition to this, the Institution is to have, at all times, the free use of the books of the congressional library as well as those of its own, and for this purpose, and the better accommodation of the public, the library of Congress is to be open throughout the year, with the exception of a month for cleaning and examination. Hence the general student, instead of being debarred any important privilege, will find increased facility for research in having access, in the same building, to both libraries. Again, the east wing of the Smithsonian building, in which the books were deposited, is not fire-proof, and is liable to destruction by accident or the torch of the incendiary, while the rooms of the Capitol are of incombustible materials. This wing was, moreover, filled to overflowing, and a more extended and secure depository could not be obtained, except by another large draught on the accumulated funds intended to form part of the permanent capital. Besides this, by the terms of the transfer, the cost of the care, binding, and cataloguing of the Smithsonian books is provided for by government, and an important part of the annual income of the Institution is thus saved for other purposes.

But the advantages of the transfer are not confined to the Institution. The library of Congress has secured such an addition as cannot be obtained by purchase, since many of the books are presents from the duplicates of the old libraries of Europe, consisting of trans-

actions and other publications of the learned societies of the world, forming a special collection, not only ranking as first in this country, but one of the best anywhere in existence. Neither is it alone the value of the books that have actually been transferred which is to be considered, but also the means which are offered, through our system of exchange, for the perpetual increase of the several series of works which contain the record of the actual progress of the world in all that essentially pertains to the mental and physical development of the human family. The transfer of the Smithson library has furthermore tended to awaken an interest in the library of Congress, which cannot fail, under the energetic superintendence of the present librarian, Mr. Spofford, in a few years to render it worthy of the national Capital. An appropriation of $100,000 has been recommended* by the Joint Committee of the two houses of Congress for the purchase of the library of Mr. Peter Force, consisting of books relative to America. With these additions the library of Congress will be the largest in the United States, and the necessity of a separate building is even already foreshadowed.

But above all, the act authorizing the reception, care, and support of the Smithson library may be considered as an approval by Congress of the general policy adopted and the course pursued by the Institution. It will be recollected that at the commencement a number of influential literary men warmly advocated the expenditure of the larger portion of the income of the Smithson fund in the establishment and support of a library. This plan was opposed on the ground that the Institution by the terms of the bequest should be of a cosmopolitan character, and produce results, the benefits of which would not be confined to one city, nor even one country, and which could not be accomplished by a library. The act of organization, however, was so expressed as to give color to the idea that a large library was intended by Congress, and much complaint was at one time made because more of the income was not expended in the purchase of books. The late legislation of Congress will leave no ground for further cavil in regard to this point, and while the Institution will be relieved from a large expenditure on account of the library, a national collection of books will be formed far more extensive than could possibly be supported by the Smithson fund.

Moreover, while thus relieving the Institution from a charge which has borne so heavily on its resources, Congress has afforded most encouraging evidence of an important advance in public opinion regard-

* An act has been passed in accordance with this recommendation, and the library of Mr. Force is now the property of the government.

ing the right interpretation of the terms of the Smithson bequest. It is substantially a recognition by the national legislature of the fact that the Smithson fund ought not to be burdened with the support of objects which, while they absorb the income, are locally restricted in their influence, and neither essentially connected with the design, nor authorized by the language of the trust. Since Congress has eventually thought proper to assume the care of the library we may cherish the hope that in due time it will also make provision for the separate maintenance of a collection of objects of "nature and art," not unworthy of the National Capital; and that the proceeds of a fund, now generally recognized as having been intended by the testator for objects of a higher order than those confined to local or even national benefit, will be entirely devoted to the system of operations which an experience of nearly twenty years has abundantly shown to be the best and most practical means of realizing the design of the testator.

It is much to be regretted that views of this kind did not prevail at the time of the organization of the Institution, for had this been the case no small amount of the funds would have been saved, and unpleasant discusssion been averted, the tendency of which could only be to obstruct and retard the full development of a system which now constitutes the distinctive and approved policy of the establishment. It is, however, scarcely a matter of surprise that Congress was not, at the time mentioned, prepared to appreciate the significance of the terms of the Smithson bequest, since the world generally has failed to recognize the importance of abstract scientific truths. Although these truths constitute the most important elements of modern civilization, since they give man power and control over the inherent forces of nature, and enable him to render these the obedient slaves of his will ; yet, there is even at this time no country, however intelligent it may appear in other respects, that has made adequate provision for the discovery and development of these important principles. Our own legislators can give no better evidence of enlightened views and wise policy than a free acknowledgement of the claims of science, and a liberal provision for its encouragement and support.

The propriety of making provision for the separate maintenance of a national museum, and of relieving the Smithson fund from the burden imposed upon it in this way, will be evident when the fact is recalled that the plan of the present expensive building was adopted to accommodate the museum of the Wilkes' exploring expedition, the care of which had been devolved upon the Institution by the law of Congress. But the Board of Regents, after the building

was completed, decided that the keeping of this museum ought not to be a charge on the Smithson fund, and before assuming the care of it asked an appropriation, at least equal to the cost of keeping the articles while in the Patent Office. Congress recognized the propriety of this position, complied with the request, and has appropropriated since the transfer, annually, $4,000. This sum, however, has not sufficed to defray the cost of attendance, even during the period of low prices previous to the war, without allowing for any increase in the number of articles, or for the interest of the money expended on the building.

It is highly gratifying to observe that a more liberal spirit at present exists. Congress has recently made provision, on an ample scale, for the accommodation of an Army Anatomical Museum, and for a Museum connected with the Agricultural Department, and it can scarcely be doubted, that on a proper presentation of the subject, the same enlightened consideration which prompted the appropriations for these kindred objects, will also induce Congress either to appropriate the Smithsonian building to the use of a National museum, under a separate organization and endowment, or else to make an annual grant of money, which, expended under the direction of the Board of Regents, shall be sufficient properly to support an establishment of this kind.

The reconstruction of the building has been carried on during the past year as rapidly as the funds at command and a due regard to the character of the work would allow. The considerations which have governed the building committee have been to render the work entirely stable in regard to materials and construction and thoroughly fire-proof, first completing such parts as were necessary for the safety of the structure, and next those most wanted for use in the operations of the establishment.

One of the most important points to be determined during the year was the kind of roof to be adopted for the main building, and, after full inquiry, the preference was given to one consisting of an iron frame with slate covering. The contract for the iron work was made with the Phœnix Iron Company of Philadelphia, but owing to unexpected delays the frame was not received in time before the setting in of frost to complete the covering with slate. The walls of the large south tower were found in a worse condition than was at first supposed, thirty feet of the height having to be removed and entirely rebuilt, the facing of cut stone being of new material. To secure the front towers and furnish supports for the iron beams and

brick arches for the floors, a lining of brick, laid in cement, has been constructed from the bottom to the top. The inner lining of the walls of the upper story of the main building, which was exposed to the fire, has also been entirely renewed with similar materials. The masonry of the whole building is now completed, and it is expected during the next season to finish all the rooms except the main hall over the museum. The future use of this room, which is 200 feet long by 50 feet wide, has not yet been settled. It will not be wanted for the uses of the Institution, and unless devoted to a National Museum or to some other purpose, it will probably remain for an indefinite time, unfinished. The reconstruction of the building, exclusive of this room, will cost about $150,000, and if to this be added the sum previously expended on the erection of the building, we shall have a total of $475,000, of which, at least, $400,000 might have been added to the principal, or expended in the promotion of knowledge.

The superintendence of the work is still under the direction of the architect, Mr. Adolf Cluss, and every part of the construction and all the plans have been critically examined and discussed by General Delafield, chairman of the building committee, who has taken great interest, since his appointment, not only in the restoration of the building, but in all the operations of the Institution.

Publications.—The amount expended for printing during 1866 has been fully equal to that in any previous year, although the number of *new* works which have been issued is less. This has been occasioned by the high price of paper and printing, and by the necessity of issuing new editions of works for which the demand was more pressing.

The following is a list of the works in *quarto*, forming part of the series entitled "Smithsonian Contributions to Knowledge," published during the year 1866:

1. An Investigation of the Orbit of Neptune, with general tables of its motion, by Professor Simon Newcomb, U. S. navy, pp. 110. (Published January, 1866.)

2. Geological Researches in China, Mongolia, and Japan during the years 1862 to 1865, by Raphael Pumpelly, esq., pp. 161, 9 plates, 18 wood-cuts. (Published August, 1866.)

3. On the Fresh-water Glacial Drift of the Northwestern States, by Charles Whittlesey, esq., pp. 32, 2 maps, 11 wood-cuts. (Published December, 1866.)

Of other quarto works in press the following are nearly ready for distribution:

1. Astronomical, Magnetic, Tidal, and Meteorological Observations within the Arctic Circle, by Isaac I. Hayes, M. D.

2. Meteorological Observations made at Brunswick, Maine, for fifty-two years, by Professor P. Cleaveland, from 1807 to 1859.

The memoirs of Newcomb, Pumpelly, and Hayes were fully described in the report for 1865. It therefore remains to give the account of that of Mr. Whittlesey on the Fresh-water Glacial Drift of the Northern States, which will be found at the end of this report.

The following works in *octavo* were also published in 1866:

1. Catalogue of publications of societies and of periodical works belonging to the Smithsonian Institution, (January,) 596 pp.

2. Monograph of American Corbiculadæ, recent and fossil, by Temple Prime, (January,) 91 pp.

3. List of works published by the Smithsonian Institution, (January,) 11 pp.

4. New species of North American Coleoptera, by Jno. L. LeConte, pages 87 to 177, of part I, (April,) 90 pp.

5. List of the Coleoptera of North America, by Jno. L. LeConte, pages 50 to 78, (April,) 30 pp.

6. Check-list of the Invertebrate Fossils of North America, Eocene and Oligocene, by T. A. Conrad, (May,) 45 pp.

7. Review of American birds in the collection of the Smithsonian Institution. By Prof. S. F. Baird. Pp. 321–450 ; (May and June,) 130 pp.

The memoirs actually completed and issued in the year therefore embraced 303 quarto pages and 993 octavo pages, which, with the annual report, 496 pages, makes an aggregate of 1,792 pages printed within the year.

New editions of the following works have been issued during the same period: Allen's Bats; Binney's Land and Fresh-water Shells, parts II and III; Instructions for collecting specimens of Natural History; circular relative to nests and eggs; check-list of shells; comparative vocabulary; ethnological instructions; catalogue of minerals; check-list of fossils ; Draper on the Telescope.

The most expensive octavo publication during the past year has been the catalogue of the transactions of learned Societies and other public bodies, as well as of encyclopedias and other serial works in the library of the Institution. The printing of this work was begun in 1863 and completed in 1866. During its passage through the press proof-sheets were sent to the principal Societies abroad, for the purpose, first, of securing accuracy in the titles; second, of showing the defi-

ciencies in our series, and thus enabling the Societies, as far as possible, to supply them. This work forms a large octavo volume of 596 pages. It has been stereotyped, and copies have been distributed to the principal libraries in this country and Europe, with a view mainly to obtain from them such duplicates as they may possess which may serve to render more complete the Smithson collection of transactions. The catalogue of the works thus obtained will be printed in an appendix, accompanied by proper indexes, when the whole will be issued and more generally distributed as one of the series of volumes of Smithsonian miscellaneous collections. From the stereotype plates an edition of this work has been struck off at the government printing office for the use of the library of Congress. This catalogue is considered the most complete work on the bibliography of publications of learned societies which has yet appeared in the English language.

Another article belonging to the octavo series is a catalogue of the eocene fossils belonging to the series of check-lists of invertebrate fossils of North America, prepared at the request of the Institution by Mr. T. A. Conrad, of Philadelphia. It contains an enumeration of all the species described from the eocene formation up to the date of publication, and is intended to facilitate the labelling of collections and the distribution of duplicate specimens.

The publication of two other parts of this series, prepared by Mr. F. B. Meek, namely, on the miocene, and on the cretaceous and jurassic species, were mentioned in a previous report.

The different series of check-lists published by the Institution have fully answered the purpose intended, in supplying a want long felt by students of natural history; and successive editions from the stereotype plates are required, the cost of which has formed a large item of the expenditure for printing during the past year.

Besides the foregoing articles 92 pages of an addition to the description of new species, and 30 pages of an addition to the list of coleoptera of North America, by Dr. John LeConte, have been printed during the year. These additions bring the works mentioned to the same point in regard to completeness as the first part of the classification of coleoptera by the same author, published by the Institution several years ago.

Another article, which will form a part of the miscellaneous collections, and printed during the year, is a list of all the works published by the Institution up to the beginning of the year 1866, enumerating 203 distinct titles, arranged under the following heads:

	Vols.
General series—Smithsonian Contributions	15
Smithsonian Miscellaneous Collections	5
Smithsonian Reports	14

	No. of papers.
Mathematics	1
Astronomy	21
Meteorology	17
Terrestrial Magnetism	11
Physics	3
General Physics of the Globe	2
Chemistry and Technology	3
Ethnology and Philology	16
Microscopical Science	4
General Natural History	3
Physiology	5
Zoology	37
Botany	9
Palæontology	9
Geology and Physical Geography	4
Bibliography	8
Architecture	1
Miscellaneous	1

Of many of the earlier of the separate publications the edition has been exhausted. Of those that remain copies can be procured, at the prices mentioned in the list, by institutions and individuals who do not come within the following rules of gratuitous distribution:

1. They are presented to all learned Societies of the first class which publish transactions, and give copies of these, in exchange, to the Institution.

2. To all foreign libraries of the first class, provided they give in exchange their catalogues and other publications, or an equivalent, from their duplicate volumes.

3. To permanently endowed colleges in actual operation in this country, provided they furnish in return meteorological observations, catalogues of their libraries and of their students, and all other publications issued by them relative to their organization and history.

4. To all States and Territories, provided they give in return copies of all documents published under their authority.

5. To all incorporated public libraries in this country, not included in any of the foregoing classes, now containing 10,000 volumes; and

to smaller libraries, where a whole State or large district would be otherwise unsupplied.

Institutions devoted exclusively to the promotion of particular branches of knowledge receive such articles published by the Institution as relate to their objects. Portions of the series are also given to institutions of lesser grade not entitled, under the above rules, to the full series; and also to the meteorological correspondents of the Institution.

The Reports are of a more popular character, and are presented—

1. To all the meteorological observers and other collaborators of the Institution.
2. To donors to its library or museum.
3. To colleges and other educational establishments.
4. To public libraries and literary and scientific societies.
5. To teachers or individuals who are engaged in special studies, and who make direct application for them.

In consideration of the growing expenses of the Institution, and the increasing demand for its publications, it may become necessary to restrict the gratuitous distribution, and to take measures to secure a larger sale by the usual methods adopted by publishers.

Reports.—The usual number of extra copies of the Report for 1865 was ordered by Congress, and, as has been the case for several years past, was stereotyped, so that future editions may be printed if required.

This volume contains, in addition to the report of the Secretary and the proceedings of the Board, the following articles:

A eulogy on General Joseph G. Totten, late Chief Engineer of the United States army, and a Regent of the Smithsonian Institution from its organization, delivered by Major General J. G. Barnard before the National Academy of Sciences; a Memoir of De Blainville, by Flourens, translated from memoirs of the the French Academy of Sciences; a report of the transactions of the Society of Physics and Natural History of Geneva for 1863 and 1864; an original article on the aurora borealis, with illustrations, by Professor E. Loomis; a translation from the German of an article on the senses of feeling and smell; a translation of a course of lectures by Professor Matteuci on electro-physiology; an essay on the palafittes or lacustrian constructions of the Lake of Neuchatel, by Professor E. Desor, of Switzerland, with notes and illustrations furnished by the author; a continuation of Plateau's researches on the figures of equilibrium of a liquid mass withdrawn from the action of gravity; an outline by Professor W. Lilljeborg, of Upsala, of the latest views of ornithologists in reference to the

classification and arrangement of the higher divisions of birds, and such as has been adopted in the museum of the Smithsonian Institution; prize questions proposed by various scientific societies in Europe; and an article on the metric system of weights and measures, with tables intended especially for the use of teachers and authors of arithmetics, prepared for the Institution by Professor H. A. Newton.

The translations are from French, German, and Italian scientific publications, not generally accessible to readers in this country, and most of them have been made by C. A. Alexander, esq., of this city, who has devoted much of his time, almost gratuitously, for a number of years, to this part of the literary work of the Institution.

We have found from experience that to obtain proper scientific translations is a very difficult matter. It is rare to find an individual having so critical a knowledge of languages, united with other requisite qualifications, as to render with fidelity and spirit such discursive popular explanations as are conveyed in the articles in the appendix to the Report for 1866 on the Senses. In this respect Mr. Alexander has evinced much ability. The meaning of the original is not only rendered with great accuracy, but with reference to peculiarities of expression on the part of the authors, and with a critical regard to the precision and correctness of the English.

It is proper to mention in this connection that we are indebted to the Superintendent of Public Printing for greater facilities than usual in the publication of the report, which, on account of the character of the articles, and their translation from foreign languages, requires more than ordinary time and care in revision.

Meteorology.—The system of meteorological observations inaugurated by the Institution, which was much interrupted by the war, is gradually being re-established, and as soon as the expenses for the restoration of the building are diminished we hope to carry it on more efficiently on an improved basis. The meteorological system under the direction of the Surgeon General is also in process of reorganization, and as soon as the military posts are permanently established it will be recommenced with improved instruments, and in harmonious relations with that of the Institution.

The following is an exhibit of the number of observers during 1866, as derived from the list given in the appendix: British America, 6; Mexico, 1; Central America, 3; Bermuda, 1; Alabama, 5; Arkansas, 2; California, 4; Colorado, 1; Connecticut, 5; Delaware, 1; Florida, 4; Georgia, 1; Illinois, 32; Indiana, 12; Iowa, 28; Kansas, 9; Kentucky, 5; Maine, 11; Maryland, 6; Massachusetts, 17; Michigan, 13; Minne-

sota, 9 ; Mississippi, 5 ; Missouri, 9 ; Montana, 1 ; Nebraska, 3 ; New Hampshire, 7 ; New Jersey, 14 ; New York, 35 ; North Carolina, 4 ; Ohio, 32 ; Oregon, 2; Pennsylvania, 23; Rhode Island, 2; South Carolina, 1 ; Tennessee, 3 ; Texas, 3 ; Utah, 5 ; Vermont, 7 ; Virginia, 2 ; Washington, 1; West Virginia, 2; Wisconsin, 15.

The whole number of observers is 352 ; of these 67 are furnished with complete sets of instruments, including barometer, thermometer, psychrometer, and rain gauge ; 331 with thermometers, 137 with barometers, 72 with psychrometers, and 227 with rain gauges, while ten report the face of the sky, direction of the wind, and casual phenomena without instruments.

The income of the Institution has not been sufficient to furnish instruments to observers, and hence from many of the stations the results are not strictly comparable with one another. There are, however, in almost every part of the country, one or more stations furnished with standard instruments, constructed by James Green, of New York, the observa tions with which may serve to determine the absolute variations of temperature, pressure and moisture at different localities, while the observations from the remainder give results comparable with themselves, and serve to determine the relative character of different seasons, as well as the data necessary for tracing the transmission of waves, as it were, of atmospheric disturbance with regard to wind, pressure and temperature.

The Institution has endeavored to collect the records of all meteorological observations which have been made on this continent, and has succeeded in obtaining a large amount of material, which will serve as the basis of an isothermal map of the country, as well as that of the peculiarities of climate of different sections. A portion of this, that, namely, which relates to the mean temperatures of years and seasons, was to have been published as the second part of the second volume of "Meteorological Results," issued some years ago by order of Congress, but the pressure of business on the public printing office in consequence of the war has as yet prevented the completion of the work. It will probably be published during the next year, either by Congress or the Institution.

Another portion of the material relates to long series of observations made at particular places. Of these we may mention the following : Those made by Prof. Caswell, at Providence, Rhode Island, for twenty-eight and a half years ; Dr. N. D. Smith, at Washington, Arkansas, for twenty years ; Prof. Cleaveland, at Brunswick, Maine, for fifty-two years ; Dr. S. P. Hildreth, at Marietta, Ohio, for forty-

one years; Prof. Z. Thompson, at Burlington, Vermont, for twenty-six years; Samuel Rodman, of New Bedford, Massachusetts, for thirty-six years.

Of the series, those of Caswell and Smith have been published in full, and those of Cleaveland and Hildreth are now in the hands of the printer, and will form a part of the sixteenth volume of the Contributions to Knowledge.

The "Monthly Bulletin of the Agricultural Department" still continues to contain a large amount of meteorological information derived from the reports of the Smithsonian observers. In preparing the materials for this a part of the time of Mr. Force, the assistant in charge of meteorology, has been occupied every month. This publication still continues to be of value to the farmer, and of interest to our observers, since it gives them a ready means of comparing their observations with those made in other parts of the country.

The anemometer, which for many years recorded the direction and intensity of the wind on the top of the high tower of the Institution, was destroyed with other instruments in the fire. As soon as the reconstruction of this tower is completed, one of Osler's anemometers will be erected in the same place. The use of one of these instruments, belonging to the National Observatory, has been kindly granted to us by the Secretary of the Navy. A standard barometer, by Newman, belonging to the Institution, now in the possession of Professor Guyot, will also be placed, with other instruments, in the same tower, and the full series of observations resumed.

The break in our series, however, is not of so much importance as at first sight it might appear, since a similar series has been kept up continually at the Observatory, which is a mile west of the Institution.

Exchanges.—The extensive system of international, scientific and literary exchanges, so long carried on by the Institution, has been fully maintained during the year. Eighty-three boxes, containing 1,170 packages, were sent to our foreign agents in 1866, and over 8,000 parcels received from them. These packages, as in former years, contain the publications of the Institution, public documents, transactions of societies and scientific works by individuals, besides specimens of natural history.

Acknowledgments are again due to the various steamship, railroad and express companies mentioned in the last report who have for a number of years contributed materially to the advance of science by the free freights and important privileges granted by them to the Institution in carrying on its system of exchange.

The agents of the Institution still continue to be Dr. FELIX FLUGEL, Leipsic, GUSTAVE BOSSANGE, Paris, WM. WESLEY, London, FREDERIC MULLER, Amsterdam.

Besides these gentlemen, Mr. JAMES SWAIM, now residing in Paris, has been appointed a special scientific agent for the purchase of philosophical apparatus and the transaction of other business, the duties of which he discharges gratuitously and to the great advantage of the Institution. We regret that notice of this fact was inadvertently omitted in the last annual report.

Explorations and collections.—As has been stated in previous reports, it is an important part of the operations of the Institution to encourage, assist and organize explorations for such portions of North and South America as have not been thoroughly investigated in regard to physical geography, climate and natural history. During the past year this part of the operations has been prosecuted with unabated energy, principally under the immediate supervision of Prof. Baird.

Those which have been made directly or indirectly under the guidance of the Institution, and more or less at its expense, are as follows:

British America.—Explorations and collections of specimens by officers of the Hudson's Bay Company in continuation of those of former years, especially those of Mr. Robert MacFarlane on the Anderson river, and of Mr. W. Brass, at Fort Halkett; Jas. Flett, at La Pierre's House; C. P. Gaudet, at Fort Good Hope; William L. Hardisty, at Fort Simpson; Strachan Jones, at Fort Rae; Jas. Lockhart, at Resolution; John Reed, at Big Island; Jas. Sibbiston and Rev. Jas. MacDonald, at Fort Yukon, and Donald Gunn, west of Lake Winnipeg; also in Labrador by Messrs. Henry Connolly and Donald A. Smith.

Russian America.—The explorations of the Collins extension of the Western Union Telegraph Company under Col. Charles L. Bulkley have been continued, and a large amount of interesting matter in regard to the ethnology, topography, and natural history of the country, collected principally by the following gentlemen has been received:

Colonel Bulkley, Captain Scammon, Dr. Fisher, Captain Sands, R. Kennicott, W. H. Dall, H. M. Bannister, J. T. Rothrock, Charles Pease, F. Bischoff, Lt. Davison, &c. Some of the collections in natural history were made by the members of this company in Kamtschatka and the western side of Behring straits.

Pacific Coast of the United States.—The explorations of J. G. Swan at Neeah bay, Puget sound, have also been continued with interesting results, as also those of Dr. C. A. Canfield at Monterey. Other explorations have been those of W. F. Schwartz, San Luis Obispo, Dr. Elliot Coues, San Pedro, and W. H. Dall, at Monterey.

Rocky Mountain Region of the United States.—The explorations of Dr. Coues and Dr. E. Palmer, in Arizona, mentioned in the last report, have been continued and completed. Dr. J. R. McKee, in New Mexico, Dr. Wernigk, in Colorado, have also made collections.

Eastern United States.—The explorations by Dr. H. B. Butcher on the lower Rio Grande, at Laredo, Texas, and by Dr. Redfield Sharp, at San Antonio; J. T. Cleu, at the Louisiana Salt Mines of Petit Anse island; in Illinois, by Joel Reeves, Robert Ridgway and Professor Henry Shimer, have all furnished interesting results.

West Indies.—The explorations here have been those of Charles Wright, in Cuba; A. E. Younglove, in Hayti; Mr. Geo. Latimer and Dr. Henry Bryant, in Porto Rico; Dr. Bryant, in the Bahamas; W. T. March, in Jamaica, and Mr. Allen, in Bermuda.

Mexico.—The explorations in this country have been those of Col. A. J. Grayson about Mazatlan and on the west coast; Dr. Charles Sartorius and Mr. Floretin Sartorius, at Mirador; Professor Sumichrast and M. Botteri, at Orizaba; Dr. Strebel, at Vera Cruz.

Yucatan.—The explorations in Yucatan of Governor Salazar, under direction of Dr. Arthur Schott, have been continued and completed.

Explorations have been made in Honduras by Dr. H. Berendt and D. B. Parsons; in Guatemala, by Mr. Henry Hague, about San Geronimo; in Nicaragua, by Dr. Earl Flint; in Costa Rica, by Dr. A. Von Frantzius, Hon. C. N. Riotte, Julian Carmiol, Juan Cooper and A. Zeledon; in Panama, by Captain J. M. Dow, J. and T. Rhoads, Dr. Totten and Dr. J. P. Kluge; in the Sandwich Islands, by Mr. Valdimar Knudsen. In South America, explorations have been made and collections transmitted by Mr. W. H. Hudson, in Buenos Ayres; Mr. A. De Lacerda, at Bahia, and Hon. A. A. Burton, at Bogota.

It should be stated in this connection that the expenses of the exploration in Honduras of Dr. Berendt have been principally met by contribution from the Chicago Academy of Sciences, Philadelphia Academy of Sciences, Dr. Henry Bryant, and Messrs. Geo. W. Riggs, W. A. Haines, H. Van Nostrand, C. M. Wheatly, R. L. Stuart, Prof. B. Silliman, Robt. L. Swift, J. H. Redfield and Thos. Bland.

For a more particular account of the nature of the contributions in natural history and ethnology reference may be made to the lists

and tables furnished by Prof. Baird in the Appendix. From these it appears that the number of entries during the year in the catalogues of specimens received is 7,254, which is about the usual annual average. Of these, nearly 4,500 were of birds.

As has frequently been stated in previous reports, the collections which are the result of the explorations made by the Institution or by the voluntary contributions of individuals, are not, primarily, intended to enlarge its museum, but for distribution to all the principal museums in the world and to furnish the materials for special researches. In accordance with this policy a distribution of over one hundred thousand labelled specimens, including 53,166 species, has been made during the year 1866 to museums and colleges where they were required for comparative investigation or as materials for instruction. Besides these distributions a large number of specimens have been intrusted to individuals for special study, viz: the insects to Baron Ostensacken, Dr. G. H. Horn, Edw. Norton, esq., W. H. Edwards, esq., and H. Ulke, esq.; the shells to P. P. Carpenter, esq., Thomas Bland, esq., Isaac Lea, esq., and George W. Tryon, esq.; the minerals to Prof. T. Egleston; the plants to Dr. John Torry; the bats to Dr. H. Allen; infusorial earths to S. A. Bailey, esq.; birds to Jno. Cassin, esq., Geo. N. Lawrence, esq., and D. G. Elliot, esq.; nests and eggs to Dr. T. M. Brewer; reptiles to Prof. E. D. Cope; fossils to Dr. Jos. Leidy and F. B. Meek, esq.

In all cases in which specimens are presented to institutions or to individuals for investigation, full credit is required to be given to the name of Smithson for the benefits thus conferred.

Library.—During the past year the library has received from exchange and donation—

Volumes:		
Octavo	922	
Quarto	226	
Folio	95	
		1,243
Parts of volumes and pamphlets:		
Octavo	3,123	
Quarto	1,103	
Folio	283	
		4,509
Maps and charts		121
Total		5,873

Showing a large increase over the receipts during the previous year.

The following are some of the larger donations received in 1866:

From the Genevese National Institute, Geneva, 17 volumes, completing the "Memoirs" and "Bulletin;"

Royal Statistical Bureau, Munich, "Contributions to the Statistics of the Kingdom of Bavaria," vols. 2–15;

Society of Emulation for the study of the History and Antiquities of Flanders, Bruges—23 volumes of their publications;

Numismatic Society, London, "The Numismatic Chronicle," 21 volumes;

Ministry of Public Instruction, Paris, "Description of Egypt, published by order of Napoleon the Great," 21 volumes folio, and several other valuable works;

Library of the Parliament, Melbourne, 51 official documents, 1st volume of "Plants Indigenous to Victoria, Australian Mosses, No. 1," and other works;

Society of Agriculture, Sciences, Arts, and Belles-Lettres, of the Department of Indre and Loire, "Annals," 12 volumes;

Friesland Society of History, Antiquities, and Philology, Leuwarden, 10 volumes and 25 pamphlets;

Government of the Netherlands, 34 volumes and 45 pamphlets;

Belgian Entomological Society, Brussels, "Annals," vols. 1–8;

University of Chili, Santiago, 10 volumes;

Charles Kessler, Reading, Pa., "The Naturalist," vols. 1–22, 1774–1787;

Dr. G. J. Fisher, Sing Sing, N. Y., medical journals and other medical books, 77 volumes;

Dr. K. Koch, Berlin, 5 volumes and 336 pamphlets;

Professor C. J. Tornberg, Lund, Sweden, 11 volumes and 8 pamphlets.

From the Royal Library of Dresden we have received a series of 232 original discourses or theses and tracts, most of which were written by Luther, and the remainder by his contemporaries, and nearly all of which were published during the lifetime of the great reformer.

These tracts were referred to Rev. Dr. Morris, librarian of the Peabody Institute of Baltimore, for a translation of the catalogue, to whom we are indebted for the following remarks in regard to them:

"The majority of these brief treatises can be found in almost any entire edition of Luther's works, and are therefore not rare; but what renders this collection interesting to the bibliographer is, that they are all *first impressions*, and not reprints. The proofs were doubtless revised and corrected by his own hand, as most of them

were printed at places where he resided. They present specimens of paper and printing which are very creditable to the artisans of that day, ranging as they do from 1518, the year after the Reformation began, to 1546, the year of Luther's death. These writings have come to us in the same type and paper in which they were distributed by thousands over the land at the dawn of the Reformation. While the language in which they are written, both German and Latin, is not as refined as that employed by scholars of the present day, and while the pictorial illustrations are coarse, yet these productions show the extraordinary progress which the typographic art had already made in the early part of the 16th century. Many of them have the title pages ornamented with a broad margin of wood-cut figures, most of them mythological and grotesque, and all curious. They are specimens of the engraving of that day, exceedingly interesting to the student of the history of art, for these are undoubted originals, which collectors of ancient prints prize so highly. A few of them are unskilfully illuminated, probably executed by some incipient artist, who tried his hand on these coarse and cheap wood-cuts. The subjects of the pamphlets are diverse and curious, and the titles of many of those which are controversial, as was the general custom of that day, are expressed in language more forcible than refined."

Under the act of Congress mentioned in the last report, previously alluded to, the Smithsonian books have been transferred to one of the fire-proof rooms in the extension of the library of Congress, where they will be catalogued under the direction of Mr. Spofford, the librarian, and the large number of volumes in sheets will be bound at the government bindery. The continued new accessions to the library from foreign exchanges and otherwise are received and recorded at the Institution as formerly. The accessions from abroad do not alone consist of transactions of societies, but also, as has been shown in this and previous reports, of some of the most costly publications of foreign governments, and rare duplicates in the older libraries of Europe.

Correspondence.—A large amount of labor connected with the operations of the Institution is devoted to correspondence. Besides those relating to official business, hundreds of letters are received in the course of a year, containing inquiries relative to the various subjects on which the writers desire information. If these cannot be forthwith answered, without much research in the Smithsonian library, they are referred to our collaborators, who are experts in the different branches of knowledge, and who can readily supply trustworthy information in regard to the subjects within the range of their special studies.

During the past year we have made references of this kind to the following gentlemen, viz: Dr. Torrey, of New York; Prof. Agassiz, Dr. Gray, and Prof. Wyman, of Cambridge; Dr. Leidy and Mr. Isaac Lea, of Philadelphia; Professors Dana, Whitney, Brush, and Newton, of New Haven; Drs. Woodward and Craig, of the Surgeon General's office; Prof. Schaffer and Mr. W. B. Taylor, of the Patent office; Admiral Davis and Prof. S. Newcomb of the Naval Observatory: and Mr. George Gibbs, and Mr. J. H. Lane of Washington.

Investigations.—During the past year a considerable portion of my own time has been devoted to investigations connected with the revenue service, light-house board, and other branches of the government. These services, as well as those of a similar character in former years, have been entirely gratuitous, and may be considered in some degree as having tended to repay the care bestowed on the Smithson trust by the government in its character of guardian and trustee.

Lectures.—Since the burning of the upper story of the building in which the lecture room was situated, the public lectures have been discontinued. I have given, however, a course on electricity to the telegraphic association of this city, and also accepted, last autumn, an invitation to deliver the opening course of lectures at the Peabody Institute, in Baltimore. I was induced to accept this invitation contrary to my general habit, in order to present, from the experience gained in the management of the Smithsonian Institution, some suggestions which might be of importance in organizing the interesting establishment so liberally endowed by our distinguished countryman. The endowment of the Peabody Institute is $1,000,000, nearly double the original Smithson fund, and sufficient, if the trust be wisely administered, to render the favored city celebrated throughout the world as a centre of literature and science. But I trust I shall be pardoned for saying, that in the case of the organization of a new institution, of which the purposes are not clearly defined, and which is entrusted to a board of trustees, it can scarcely be possible that the best course can be adopted at once. There will always be honest differences of opinion, and these will lead to compromises incompatible with a unity of plan, giving rise to difficulties in the future. The wisest course, therefore, in such cases, is to proceed cautiously, and on no account to adopt a plan which cannot be modified, or which shall call for any considerable expenditure of the principal of the endowment. I may, perhaps be allowed to say, that the publication of the remarks in full would probably be of importance in

diffusing information derived from the experience of the Smithsonian Institution, especially wanted at this time, when so many new institutions are about to be organized; but they would be out of place in this report, though they may be given in the appendix or elsewhere.

Whittlesey on the Drift.—The following is an account of the paper on the drift before mentioned which has not yet been described.

The term drift, as employed in geology, includes the collection of gravel, sand, clay, and stones occurring over portions of the continent without stratification or order of arrangement, and which have evidently been transported and distributed without the agency of rivers. For the study of this formation in the territory north of the Ohio river and east of the Mississippi to the national boundary, Mr. Whittlesey claims to have had special opportunities during the past twenty-five years. The length north and south of this area is about eleven degrees of latitude, from the 38° to the 49°, its breadth being quite irregular. Its eastern boundary is a line passing through the middle of the system of North American lakes, and to the west it extends at least to the Lake of the Woods. Over this space he has found what he considers but one formation, belonging to the post-tertiary, wholly of fresh-water origin, no remains as yet having been found of a salt water character, while to the eastward of Lake Erie, in the valleys of Lakes Ontario and Champlain, and the River St. Lawrence, the shells which occur are wholly marine. Further examination he supposes will show that the fresh-water formation overlaps the marine, and is consequently more recent. The thickness of the fresh-water drift is variable, in some places from 600 to 1,000 feet, though it seldom exceeds 200 or 300 feet. The author uses the term glacial drift to describe this formation as expressing what he conceives to be its origin in accordance with the theory originally proposed by Professor Agassiz, viz., an immense sheet of ice, at first principally confined to the pole of greatest cold, but gradually increasing its area by accumulations of snow in winter on its central part, and by the thawing in summer of the surface, the subsequent freezing and expansion of the infiltered water producing a slow but almost resistless motion outward in every direction from the centre. This sheet of ice, like the modern glacier, having fragments of hard stone imbedded in its lower surface, would furrow and grind the rocks underneath—would bear on its upper surface, and within its interior, boulders and fragments of rocks which fell on it in its passage through mountain gorges, or which it tore from their sides, and, in addition to these, would carry with it the materials eroded in its passage; and finally, on melting,

would leave the whole in a condition identical with that in which the drift formation is found. This formation, according to the author, may be divided into three members, in the order of superposition, from the surface downward, composed as follows: The first of coarse sand, gravel, loam, and hard-pan, with large boulders from northern rocks, exhibiting little stratification. The second of sand and gravel, less coarse than the preceding, with irregular bands of clay somewhat laminated, and smaller boulders. The third of fine laminated sand, of marly clay of great thickness, of various colors, with few boulders and little gravel. Wherever a sufficient thickness of drift occurs these divisions can be readily traced, and always in the same order. The first occupies the highest points of land, and frequently lies upon the rock formation without the intervention of the other beds, and in it occur moraine hillocks and depressions intermingled with the underlying strata at different points, indicating the movement of ice, which, while it brought materials from a distance, ploughed up and pulverized the previously existing surface.

This upper member of the drift contains the coarsest material and the largest and most numerous boulders, a fact inexplicable on any other theory excepting that of their deposit by the melting of glaciers carrying on their surface the heavier masses. The surface is pitted with cavities extending below the general level ten, fifteen, and even a hundred feet, their outline being rudely circular, and their sides as steep as is compatible with the stability of the soil. In travelling through this region the explorer frequently finds these hollows so near together that he no sooner rises out of one than he is obliged to descend into another. They seldom contain water, but boulders are found at the bottom, on the sides, and on the surface around. In the prairie regions of southern Wisconsin, timber grows within the cavities, as well as on the adjacent surface, in clumps, known as oak orchards. The formation of such a system of depressions of so uniform a character, and over so large an extent of country, while the rocks beneath, wherever uncovered, are found polished and grooved, also indicates the movements and subsequent melting of large masses of ice. In various places there occur patches of boulders from among which the finer materials have been washed away. Near Twin Falls, on the Menomonee river, in Michigan, on the northern slope of a mountain, such a collection occurs nearly a mile across, covering the surface like a pavement with large masses smoothed and polished by attrition. Along the heights of land collections of boulders also frequently occur. After passing northward, above Lake Winnebago,

the portion of sand increases, and also the size and number of the boulders, which are mostly of igneous origin.

The second member of the glacier drift is not as readily made out as the other two. In general it is thin, passing into the first member above, and into the third below. Its characteristics are the finer condition of the material and more distinct stratification in the alternate layers of clay and sand. It is seen in its greatest development at the Grand Sable of Lake Superior, east of Grand island, where the coarse sand forms a stratum of from three to four hundred feet in thickness, overlying a thin stratum of clay. The prominent mountains and dunes along the eastern shore of Lake Michigan belong to this member of the drift formation.

The third member consists of the ash-colored, the red, and the blue laminated clays, the difference of color being probably caused by varying portions of oxide of iron. These strata are not, strictly speaking, formed of clay, but of finely comminuted sand, marl, and oxide of iron, with alumina enough to cause adhesion. On the summit of the land whence the streams flow northwardly into Hudson's bay, southerly into the gulf of Mexico, and southeasterly into Lake Superior, the three members of the drift period are conspicuously exhibited—the third occupying the lower level. On Lake Superior the lower member attains its greatest thickness. The rocks on which the glacial drift rests, wherever uncovered, exhibit markings and indications of scouring and striæ with variable distinctness, depending upon the capability of the rock to retain the impressions. In some cases the movement was parallel, or nearly so, to the strike of the strata, and in such instances sandstone beds have been carried away to a considerable depth, leaving long, narrow ridges of material better able to resist the grinding action. The general movement, as indicated by the striæ, was from the northeast to the southwest, the same as that observed in the northern part of Europe. In New England, markings of this kind on the rocks have been observed at 3,000 feet elevation, in Ohio at from 1,300 to 1,400 feet, and at Point Keewenaw, in Lake Superior, at from 1,400 to 1,600 feet. These elevations indicate the great thickness which the glacial ice must have attained. In various parts of the drift, boulders and nuggets of copper occur, which, in some cases, have been transported a long distance southward. Those found near Lake Superior, which have not been carried far from their origin, are of great size, and not as much rounded by attrition as those found at a greater distance. One of the former, from the clay on the west fork of the Ontonagon river, now in the

museum of the Smithsonian Institution, weighs 3,000 pounds, presenting angular points.

One of the characteristics which denotes the unity of the drift is the presence of wood, leaves and other vegetable matter. The imbedded timber is the same throughout the formation and is similar to that of the present growth of a more northern latitude, consisting of pine, spruce, willow, and white cedar, the latter being most abundant. At Cleveland, Ohio, the entire trunk of a white cedar, twenty feet in length, filled with proto-sulphide of iron, was found imbedded in the drift eighteen feet below the surface, and many wells in that city are rendered unfit for use by the layer of vegetation through which the water passes.

Animal remains, such as those of the elephant, mastodon, and horse are found in the same formation, in addition to various varieties of fresh-water shells.

Through the western country there are bluffs and terraces composed of solid rock, but besides these there are others composed of boulders, gravel, hard-pan, clay, or sand. The former were the result of geological causes more ancient than the drift, while the latter are contemporaneous with this formation, and are probably due to parallel currents. What are commonly known as lake ridges, according to the author, are not ancient beaches, but the result of lateral currents distributing the drift. All the rivers and streams cut through these ridges and exhibit the drift clay frequently down to the rock below, while the beaches evidently belong to the alluvial period. Ancient lake ridges must not, therefore, be confounded with lake beaches. The distinctive feature of the latter is that they are narrow and steepest on the lake side, resembling terraces.

In the prairie region of Illinois, Wisconsin, Iowa, and Missouri the general surface is very uniform, but little elevated above the northern lakes. A rise of only twenty-six feet in Lake Michigan would turn its surplus waters across the summit into the Illinois river. Over a territory embracing Ohio, Indiana, Illinois, Iowa and part of Kentucky, Tennessee, Missouri, Wisconsin, Michigan, and Canada West, there are no considerable elevations. This space is an extended basin with a rolling surface, in which glacial action, unobstructed in its movement, would tend to produce but little change in the general topography, and therefore the position of valleys, rivers, and lakes is about the same at present as it was before the glacial period. The motion of the ice, however, must have removed a large portion of the broken fragments of the northern rocks to positions further south. The appearance would indicate that, as the glacial period

drew towards its close, the transporting material changed from one in which ice predominated to a modified one of ice and water.

Remarks are also made in this paper on the encroachment of the water upon the land, as indicating the slow but constant changes to which the surface of our earth is subjected. The clay bluffs of the lakes are continually worn away by the action of springs, rains, winds, and waves. They are attacked at the base, partially undermined, and finally precipitated into the water with the trees and whatever may be resting upon them. In due time they are spread over the bottom of the lake, forming new strata to be, perhaps, investigated by future geologists. Lakes Erie and Michigan, the shores of which are composed of drift clay, are filling up more rapidly than Lakes Huron and Superior, the coasts of which are more rocky.

Another phenomenon noticed is that of lines of boulders within and parallel to the shores of shallow lakes, presenting, in some cases, the appearance of a rude wall or fence of large stones. For example, in Mille lake, Minnesota, there are lines of this kind rising five and six feet above the water level, and formed of stones far too heavy to have been moved by the action of the waves. More than fifty years ago a similar appearance was described by President Dwight, of Yale College, as observed at Salisbury, Connecticut. The movement of the stones towards the shore was in this case clearly indicated by the troughs left in the bottom of the lake, visible in clear water. The phenomenon is now satisfactorily referred to the expansion of ice in which the boulders are imbedded in winter. This takes place in every direction from the centre of the lake outward, and is exerted in the case of ice of considerable thickness with almost irresistible energy. The stones are carried forward, and on the thawing of the ice are left in their new position.

The last section of the paper refers to examples of erosions, also referable to the movement of the ice of the glacial period. These are particularly exhibited in the great projection into Lake Superior from the southern shore called Point Keweenaw, in which are scooped out depressions, forming the basins of lakes, inlets, and harbors, exhibiting evidence of the direction and intensity of the transforming force, and it is probable that the shore line, and form of the bottom of the great lakes must have been modified by the action of the same cause. This work is illustrated by a map of North America, a profile of the deposits from Lake Erie to the Lake of the Woods, and eleven wood cuts.

Respectfully submitted,

JOSEPH HENRY,
Secretary Smithsonian Institution.

APPENDIX

TO THE

REPORT OF THE SECRETARY.

REPORT OF THE ASSISTANT SECRETARY, SPENCER F. BAIRD, RELATIVE TO EXCHANGES, COLLECTIONS OF NATURAL HISTORY, ETC.

During the past year 763 principal packages have been received at the Institution by the various channels of transportation, and 768 sent out from it—being a considerable increase over the numbers of last year.

The principal statistics of the exchanges will be found in the following tables marked A, B, C, and D:

A.

Receipts of books, &c., by exchange in 1866.

Volumes:		
Octavo	922	
Quarto	226	
Folio	95	
		1,243
Parts of volumes and pamphlets:		
Octavo	3,123	
Quarto	1,103	
Folio	283	
		4,509
Maps and charts		121
Total		5,873

The corresponding receipts for last year were 4,206, showing an increase of 1,667.

B.

Table showing the statistics of the exchanges of the Smithsonian Institution in 1866.

Agent and country.	Number of addresses.	Number of packages.	Number of boxes.	Bulk of boxes in cubic feet.	Weight of boxes in pounds.
DR. FELIX FLÜGEL, *Leipsic*—					
Sweden	11	21	.....	.....	.....
Norway	5	10	.....	.....	.....
Denmark	11	12	.....	.....	.....
Iceland	1	2	.....	.....	.....
Russia	44	49	.....	.....	.....
Germany	311	332	.....	.....	.....
Switzerland	33	38	.....	.....	.....
Special sending in May	.....	120	.....	.....	.....
Total	416	584	29	203	7,350
FREDERICK MÜLLER, *Amsterdam*—					
Holland	45	53	.....	.....	.....
Belgium	11	14	.....	.....	.....
Total	56	67	5	35	1,250
GUSTAVE BOSSANGE & CO., *Paris*—					
France	101	104	.....	.....	.....
Italy	59	61	.....	.....	.....
Spain	7	8	.....	.....	.....
Portugal	3	4	.....	.....	.....
Special sending in May	.....	40	.....	.....	.....
Total	80	217	15	105	3,750
W. WESLEY, *London*—					
Great Britain and Ireland	186	207	.....	.....	.....
Australia	19	19	.....	.....	.....
Total	205	226	12	96	3,000
Rest of the world	70	76	22	132	2,800
Grand total	827	1,170	83	571	18,050

C.

Addressed packages received by the Smithsonian Institution from parties in America for foreign distribution in 1866.

	Number of packages.
Albany, N. Y.—	
Dudley Observatory	125
New York State Agricultural Society	72
New York State Homœopathic Society	10
Prof. James Hall	46
Ann Arbor, Mich.—	
Prof. A. Winchell	13

Boston, Mass.—	
American Academy of Arts and Sciences	280
Board of State Charities	10
Boston Society of Natural History	231
J. J. Bowditch	1
Dr. B. A. Gould	46
Dr. S. G. Howe	1
Theodore Lyman	20
Buffalo, N. Y.—	
G. W. Clinton	1
Cambridge, Mass.—	
Cambridge Observatory	101
Harvard College	20
Museum of Comparative Zoology	913
Nautical Almanac Office	52
Prof. H. J. Clark	25
Prof. Asa Gray	12
Chicago, Ill.—	
Chicago Academy of Sciences	102
Columbus, Ohio—	
Ohio State Board of Agriculture	88
W. S. Sullivant	1
Dorchester, Mass.—	
Dr. Edw. Jarvis	53
Hillsboro', N. C.—	
Dr. M. A. Curtis	1
Iowa City, Iowa—	
State University of Iowa	12
Janesville, Wis.—	
Institution for the Blind	125
Lowell, Mass.—	
J. R. Francis	17
New Haven, Conn.—	
American Journal of Science	27
American Oriental Society	5
Prof. J. D. Dana	48
Prof. E. Loomis	53
New York—	
American Ethnological Society	6
New York Lyceum of Natural History	114
United States Sanitary Commission	400
Thomas Bland	25
A. A. Julien	9
Baron Ostensacken	1
Philadelphia, Penn.—	
Academy of Natural Sciences	184
American Pharmaceutical Society	31
Dr. John L. LeConte	9
G. W. Tryon	53

Providence, R. I.—	
State of Rhode Island	6
Rock Island, Ill.—	
B. D. Walsh	1
San Francisco, Cal.—	
Prof. W. P. Blake	15
Dr. Newcomb	50
St. Louis, Mo.—	
Academy of Sciences	165
Dr. George Engelmann	30
Dr. B. F. Shumard	9
Dr. A. Wislizenus	90
Toronto, Canada—	
Canadian Institute	5
Dr. C. J. Bethune	5
Washington, D. C.—	
Census Bureau	4
Surgeon General United States army	392
Prof. Newcomb	85
Dr. Wetherill	25
Wilmington, Del.—	
W. M. Canby	2
	4,137

The preceding tables show a large increase over the numbers of 1865, there being a difference of 1,574.

D.

Addressed packages received by the Smithsonian Institution from Europe in 1866 for distribution in America.

	No. of packages.
ALBANY, NEW YORK.	
Albany Institute	3
Dudley Observatory	10
New York State Agricultural Society	19
New York State Library	28
New York State Medical Society	2
New York State University	2
State Cabinet of Natural History	1
AMHERST, MASSACHUSETTS.	
Amherst College	6
ANNAPOLIS, MARYLAND.	
United States Naval Academy	1
ANN ARBOR, MICHIGAN.	
Observatory	3
AUSTIN, TEXAS.	
State Library	15
BALTIMORE, MARYLAND.	
Maryland Historical Society	2
State Library	12
BLACKWELL'S ISLAND, NEW YORK.	
New York City Lunatic Asylum	1
BOSTON, MASSACHUSETTS.	
American Academy of Arts and Sciences	98
Christian Examiner	2
American Statistical Association	11
American Unitarian Association	3
Boston Christian Register	3
Boston Society of Natural History	197
Bowditch Library	1
Geological Survey of Massachusetts	1
Historical Society of Massachusetts	2
New England Historico-Genealogical Society	2
North American Review	2
Prison Discipline Society	2
Public Library	14
State Library	6
Technological Institute	1
BRATTLEBORO', VERMONT.	
State Lunatic Asylum	1
BRUNSWICK, MAINE.	
Bowdoin College	8
BURLINGTON, VERMONT.	
University of Vermont	1
CAMBRIDGE, MASSACHUSETTS.	
American Association for Advancement of Science	27
Astronomical Journal	2
Harvard College	17
Museum of Comparative Zoology	8
National Academy of Sciences	22
Observatory of Harvard College	14
Perkins' Institution for the Blind	1
CHARLESTON, SOUTH CAROLINA.	
Astronomical Observatory	4
Elliott Society of Natural History	103
Society Library	13
South Carolina Historical Society	5
CHARLOTTESVILLE, VIRGINIA.	
University of Virginia	19
CHICAGO, ILLINOIS.	
Chicago Academy of Sciences	21
CINCINNATI, OHIO.	
Astronomical Society	2
Dental Register	1
Mercantile Library Association	1
Observatory	4
COLUMBIA, MISSOURI.	
Geological Survey of Missouri	9
COLUMBIA, SOUTH CAROLINA.	
South Carolina College	10
State Library	10
COLUMBUS, OHIO.	
Ohio State Board of Agriculture	58
CONCORD, NEW HAMPSHIRE.	
New Hampshire Historical Society	2
State Lunatic Asylum	1

D.—*Addressed packages received by the Smithsonian Institution, &c.*—Contin'd.

	No. of packages.
DES MOINES, IOWA.	
State Library	23
DETROIT, MICHIGAN.	
Michigan State Agricultural Society	10
FRANKFORT, KENTUCKY.	
Geological Survey of Kentucky	7
GAMBIER, OHIO.	
Kenyon College	1
GEORGETOWN, D. C.	
Georgetown College	5
HALIFAX, NOVA SCOTIA.	
Nova Scotian Institute of Natural Sciences	1
HAMPDEN SYDNEY, VIRGINIA.	
Hampden Sydney College	1
HANOVER, NEW HAMPSHIRE.	
Dartmouth College	9
HARRISBURG, PENNSYLVANIA.	
State Library	1
State Lunatic Hospital	1
HARTFORD, CONNECTICUT.	
Trinity College	4
Young Men's Institute	1
HUDSON, OHIO.	
Western Reserve College	1
IOWA CITY, IOWA.	
Iowa State University	27
JACKSON, MISSISSIPPI.	
State Library	15
JACKSONVILLE, ILLINOIS.	
Illinois State Lunatic Hospital	1
Institution for Blind	2
JANESVILLE, WISCONSIN.	
Institution for Blind	1
JEFFERSON CITY, MISSOURI.	
Historical Society of Missouri	1
KINGSTON, JAMAICA.	
Jamaica Society of Arts	1
LEXINGTON, KENTUCKY.	
Eastern Lunatic Asylum	1
LITTLE ROCK, ARKANSAS.	
State Library	167
State University	5
LOUISVILLE, KENTUCKY.	
University	5
MILLEDGEVILLE, GEORGIA.	
Oglethorpe University	19
State Library	13
MONTGOMERY, ALABAMA.	
State Library	15
MONTPELIER, VERMONT.	
State Library	8
MONTREAL, CANADA.	
Geological Survey of Canada	1
Natural History Society	7
NASHVILLE, TENNESSEE.	
State Library	13
State Lunatic Asylum	1
NEW BRUNSWICK, NEW JERSEY.	
Geological Survey of New Brunswick	9
NEW HAVEN, CONNECTICUT.	
American Journal of Science and Arts	46
American Oriental Society	30
Connecticut Academy of Sciences	2
Yale College	16

D.—*Addressed packages received by the Smithsonian Institution, &c.*—Contin'd.

	No. of packages.
NEW ORLEANS, LOUISIANA.	
New Orleans Academy of Sciences	23
NEW YORK, NEW YORK.	
American Ethnological Society	5
American Geographical and Statistical Society	25
American Institute	8
Astor Library	7
Austrian Consulate	1
Columbia College	4
Mercantile Library Association	2
New York Academy of Medicine	3
New York Christian Inquirer	2
New York Lyceum of Natural History	52
United States Sanitary Commission	1
University	3
OLYMPIA, WASHINGTON TERRITORY.	
State Library	1
OMAHA, NEBRASKA.	
State Library	1
OXFORD, MISSISSIPPI.	
University of Mississippi	1
PENFIELD, GEORGIA.	
Mercer University	1
PHILADELPHIA, PENNSYLVANIA.	
Academy of Natural Sciences	131
American Journal of Conchology	1
American Pharmaceutical Association	9
American Philosophical Society	59
Central High School	1
Entomological Society	8
Franklin Institute	16
Girard College	1
Historical Society of Pennsylvania	4
Hospital for Insane	1
Philadelphia Library Company	1
Pennsylvania Horticultural Society	7
Pennsylvania Institution for Blind	1
Wagner Free Institute	2
PORTLAND, MAINE.	
Portland Society of Natural History	18
PRINCETON, NEW JERSEY.	
Princeton College	5
PROVIDENCE, RHODE ISLAND.	
Brown University	6
Secretary of State	1
QUEBEC, CANADA.	
Literary and Historical Society of Quebec	2
RALEIGH, NORTH CAROLINA.	
State Library	13
RICHMOND, VIRGINIA.	
Historical Society of Virginia	6
State Library	2
SACRAMENTO, CALIFORNIA.	
State Library	1
ST. JOHN, NEW BRUNSWICK.	
Natural History Society	1
ST. LOUIS, MISSOURI.	
Deutsches Institut zur Beförderung der Wissenschaften	2
St. Louis Academy of Sciences	92
University	3
SALEM, MASSACHUSETTS.	
Essex Institute	11
SAN FRANCISCO, CALIFORNIA.	
California Academy of Natural Sciences	45
Geological Survey of California	1
SAVANNAH, GEORGIA.	
Georgia Historical Society	4
SPRINGFIELD, ILLINOIS.	
Illinois State Agricultural Society	1
STAUNTON, VIRGINIA.	
Western Lunatic Asylum	1
STOCKTON, CALIFORNIA.	
California State Lunatic Hospital	1

D.—*Addressed packages received by the Smithsonian Institution, &c.*—Contin'd.

	No. of packages.
TAUNTON, MASSACHUSETTS.	
State Lunatic Asylum	1
TORONTO, CANADA.	
Canadian Institute	11
Observatory	1
University College	2
TUSCALOOSA, ALABAMA.	
University of Alabama	1
UTICA, NEW YORK.	
American Journal of Insanity	2
New York State Lunatic Asylum	1
WASHINGTON, D. C.	
Bureau of Ordnance and Hydrography	2
Census Bureau	3
Department of Agriculture	3
Library of Congress	3
Medical Department	32
Navy Department	2
WASHINGTON, D. C.—Continued.	
Ordnance Bureau	2
Secretary of the Interior	1
Secretary of the Treasury	1
Secretary of War	2
Topographical Bureau	1
Treasury Department	8
United States Coast Survey	16
United States Naval Observatory	72
United States Patent Office	136
WATERVILLE, MAINE.	
Waterville College	2
WILLIAMSBURG, VIRGINIA.	
Eastern Lunatic Asylum	5
WINDSOR, NOVA SCOTIA.	
King's College	4
WORCESTER, MASSACHUSETTS.	
American Antiquarian Society	6

Total addresses of institutions	169	
Total addresses of individuals	160	
		329
Total number of parcels to institutions	2,205	
Total number of parcels to individuals	498	
		2,703

ADDITIONS TO THE COLLECTIONS OF THE INSTITUTION IN 1866.

The total number of distinct donations in 1866 amounts to 220; the number of donors being 168. This exhibits a considerable increase over the figures of 1865, which are 155 and 102, respectively. The number of different packages received was 318, as compared with 257 of 1865.

The precise character of the collections received will be best gathered from the list of donations given further on. As will be seen they come from many different localities throughout the continent of America; the most important, however, being those from the officers of the Hudson's Bay Company, in Arctic America.

WORK DONE IN MUSEUM AND COLLECTIONS IN 1866.

Much labor has been expended during the year in cleaning the specimens on exhibition, and otherwise repairing the damage of the fire of 1865. The difficulty of preventing the rain and melted snow from coming through the temporary roof has caused great trouble from mould, requiring energetic measures of relief. No mounted specimens have been added to the collection.

As usual the collections received have been regularly entered and catalogued. The following table shows what has been done in this respect:

Table showing the entries in the record books of the Smithsonian Institution in 1865 and 1866.

Class.	1865.	1866.
Skeletons and skulls	6,609	7,100
Mammals	8,416	8,685
Birds	40,554	45,000
Reptiles	6,544	6,582
Fishes	5,588	5,591
Eggs of birds	9,939	10,400
Crustaceans	1,287	1,287
Mollusks	18,103	18,500
Radiates	2,725	2,725
Annelides	110	110
Fossils	5,907	5,920
Minerals	4,940	4,941
Ethnological specimens	1,125	2,260
Total	111,847	119,101

The comparison of the two columns shows that the number of entries during the year in the catalogues of specimens amounts to 7,254, about the usual annual average. Of birds alone the entries were nearly 4,500.

The following table exhibits the distribution of duplicate specimens in 1866, as compared with previous years:

Approximate table of distribution of duplicate specimens by the Smithsonian Institution to the end of 1866.

Class.	In 1865.		Total to end of 1865.		1866.		Total to end of 1866.	
	Species.	Specimens.	Species.	Specimens.	Species.	Specimens.	Species.	Specimens.
Osteology	1	1	64	64	40	40	104	104
Mammals	21	33	770	1,543	24	31	794	1,574
Birds	233	1,038	7,497	11,530	582	756	8,079	12,286
Reptiles	74	126	1,631	2,591	10	18	1,641	2,609
Fishes	750	1,200	2,393	5,149	1	1	2,394	5,150
Eggs of birds	893	2,421	3,603	9,162	96	217	3,699	9,379
Shells*	5,780	11,086	18,212	59,663	49,200	102,551	67,412	162,214
Radiates	.....	.....	551	727	.....	.....	551	727
Crustaceans	.....	.....	1,013	2,516	.....	.....	1,013	2,516
Marine invertebrates generally	200	550	1,800	5,060	38	92	1,838	5,152
Plants	10,000	12,975	10,000	12,975	3,058	5,328	13,058	18,303
Fossils	2,224	5,319	2,971	7,557	.....	.....	2,971	7,557
Minerals and rocks	250	600	1,321	5,554	25	25	1,346	5,579
Ethnology	.....	.....	58	58	92	92	150	150
Total distribution	20,426	35,349	51,884	124,149	53,166	109,151	105,050	233,300

* Of shells 390 sets were made up, and distributed to over 100 different institutions.

From the table it will be seen that the distribution of specimens in 1866 has amounted to nearly as much as in all previous years put together, the number of species being, indeed, greater. This is due to the extensive and final distribution of shells of the United States exploring expedition, &c.

The following assignment of Smithsonian materials for investigation or conservation has been made during the year 1866:

Dr. H. Allen, Philadelphia.—Collections of cheiroptera, especially those gathered by Dr. Coues in Arizona.

S. A. Bailey, Utica.—Specimens of infusorial earths.

Thomas Bland, New York.—Collections of land shells, made by Mr. Charles Wright in Cuba, Mr. Strebel in Mexico, Mr. Stearns and Dr. Flint in Nicaragua.

Dr. T. M. Brewer, Boston.—Nests and eggs of American slender-billed oscine birds.

Dr. P. P. Carpenter, Montreal.—Collections of shells, made by Mr. John Xantus at Manzanillo, Messrs. W. H. Dall and Dr. C. A Canfield at Monterey, California, James G. Swan in Puget sound, and various other west coast series.

John Cassin, Philadelphia.—Icteridæ of the general Smithsonian collection.

Prof. E. D. Cope, Philadelphia.—Reptiles collected by Mr. D. B. Parsons at Belize, Dr. A. Schott in Yucatan, Mr. Kennicott and others in Nicaragua, Prof. Sumichrast in Mexico, and Mr. A. E. Younglove in Hayti.

W. H. Edwards, Newburgh.—Lepidoptera, collected in Russian America, by the Russian telegraph expedition, by Drs. Coues and Palmer in Arizona, and Mr. Botteri and Prof. Sumichrast in Mexico.

Prof. Thomas Egleston.—All the unlabelled boxes of minerals.

D. G. Elliot, New York.—Various species of North American birds, to be figured in his work.

Dr. G. H. Horn, Philadelphia.—Various exotic coleoptera.

Isaac Lea, Philadelphia.—Mexican and other unionidæ.

R Ostensacken, New York.—Mexican diptera, collected by Mr. Botteri.

Edward Norton, Farmington, Conn.—Hymenoptera, collected in Mexico by Prof. Sumichrast.

Dr. Joseph Leidy, Philadelphia.—Various specimens of fossil mammal remains.

George N. Lawrence, New York.—Costa Rican and other birds.

Dr. John Torrey, New York.—Plants of western America, collected by Mr. Brydges, and other botanical specimens.

George W. Tryon, Philadelphia.—Melaniadæ of the United States and Mexico.

H. Ulke, Washington.—Coleoptera, collected by the Russian telegraph expedition.

ADDITIONS TO THE COLLECTIONS OF THE SMITHSONIAN INSTITUTION IN 1866.

Akhurst, John.—Skin of mouse, Brooklyn.
Aldrich, Mr.—Rattlesnake in alcohol, from Maryland.
Allen, C. M.—Series of birds breeding in Bermuda.
Ayres, Dr. W. O.—Types of California fishes.
Bannister, H.—(See *Bulkley.*)
Beadle, Rev. E. R.—Fossil echinoderms from desert of Sinai, and recent shells.
Bell, J. G.—Skins of South American birds.
Berendt, Dr H.—Two boxes zoological collections from Belize.
Bland, Thomas.—Fifty species West Indian land shells.
Boardman, G. A.—Box of birds from New Brunswick.
Bode, Mrs.—Skins of South American birds.
Botteri, M.—Birds and mammals of Mexico.
Bradford, U. S. A., Dr. G. H.—Encrinite from New Mexico.
Brass, W.—Zoological collections from Fort Halkett.
Brevoort, J. C.—Specimen of *Tragulus* from Java; died in captivity.
Brigham & Mann, Messrs.—Series of Hawaiian plants.

Bryan, O. N.—Albino blackbird, and fossils from Prince George county, Md.
Bryant, Dr. Henry—Birds of Belize and Bahia
Brydges, Mrs.—Box of plants collected in Chile and Bolivia by Mr. Brydges.
Bulkley, Colonel C. S.—Collections of Russian telegraph expedition, in various departments of natural history, made by Robert Kennicott, Dr. Fisher, Captain Sands, Captain Scammon, W. H. Dall, Henry Bannister, and J. F. Rothrock.
Bulkley, Colonel C. S.—Tusk of mammoth from Behring straits.
Butcher. Dr. H. B.—Collection of birds, &c., of the Lower Rio Grande, Texas.
Canfield, Dr. C. A.—Collection of birds, eggs, and marine invertebrates of California.
Carmiol, J.—Birds and butterflies of Costa Rica.
Clarke, O—Silicious cinder from burning of wheat bran.
Cleu, J. F.—Large masses of rock salt, portions of tusks and teeth of fossil elephant, and pieces of cane-matting found below the elephant remains, at a depth of thirteen feet, and just above the salt. From Petit Anse island, Vermillion bay, Louisiana.
Chicago Academy of Sciences.—Specimens of *Amblystoma luridum.*
Chute, R.—Infusorial earth, St. Anthony's Falls.
Collier, D. C.—Chalk from a bluff seventy-five feet high, on the Smoky Hill river, Colorado.
Collins, Colonel W. O.—Skull and horns of *Cervus macrotis*, and dress of Indian chief, from Fort Laramie.
Connolly, Henry.—Skins and eggs of birds from Labrador.
Cooper, Dr. J. G.—*Hesperomys californicus*, and skin of hammer head shark, from California; skull of Indian from Santa Catalina.
Cooper, Juan.—Skins of birds of Costa Rica.
Copenhagen, Royal Zoological Museum.—Nine specimens of skins of North European seals.
Corse, Mr.—Two bottles reptiles, Fort Tejon.
Coues, U. S. A., Dr. S. E.—Four hundred skins of birds, and other collections, from Arizona and California.
Creamer, David—Lignite from near Baltimore.
Curtis, Dr. M. A.—Skins of *Sorex* and *Hesperomys.*
Dall, W. H—Shells collected at Monterey, and types of *Helix chersonella.*
Dall, W. H.—(See *Bulkley.*)
Darby, Dr. J. E—*Melaniadæ* from Tennessee river.
Davis, Henry.—Fresh-water shells from Iowa.
Dean, Henry C.—Gray fox, *(Vulpes virginianus,)* in flesh.
Dolbech, James.—Gold-bearing quartz from Great Falls of Potomac.
Dorman, O. M.—Shells, Michigan.
Dorr, R. R.—Nest of *Geothlypis trichas* and insects.
Dow, Captain J. M.—Zoological specimens from Panama.
Dow, Captain J. M.—(See *Totten.*)
Dresden, Royal Mineralogical Museum of.—(Through Professor H. B. Geinitz.) two boxes of fossils and minerals.
Ellsworth, Captain E. D.—Piece of oak from the hull of Congress Galley, sunk in Lake Champlain, 1776, near town Panton, Vermont.
Engelmann, Dr. Geo.—Head of surf duck: *Pelionetta perspicillata.*
Fisher, Dr.—(See *Bulkley.*)
Flett, James.—Zoological collection from Fort Good Hope, Arctic America.
Flint, Dr. Earl.—Birds, shells, insects, and plants from Nicaragua.
Foreman, Dr. Ed.—Salamander from Maryland.
Foster, Hon. L. F. S.—Scalp of Navajo chief Ganado Blanco, from Fort Sumner, New Mexico.
Frantzius, Dr. A. Von.—Skin of birds of Costa Rica.

Gatchell, Dr. H. T. F.—Dried toad from Kenosha, Wisconsin.
Gaudet, Charles P.—Zoological collection from Peel's river, Arctic America.
Geinitz, Professor H. B.—(See *Dresden.*)
Gilpin, Dr.—Skin of Sorex; Halifax.
Glover, Professor T.—Two mounted birds.
Goss, B F.—Skins of *Reithroden* and *Arvicola*, Kansas.
Grayson, Colonel A. J.—Box of birds of Mazatlan.
Grier, Colonel.—Scale of fish from Loess, near Vicksburg.
Gruber, Ferd.—Box of birds of California, and egg of "Mexican wren."
Gundlach, Dr. J.—*Caercba* and *Myiadestes* in alcohol, from Cuba.
Gunn, Donald.—Zoological collections from lakes west of Lake Winnipeg.
Haldeman, Professor S. S.—Three boxes of fossils invertebrata, and types of American fresh-water shells.
Hardesty, W. L.—Ethnological and other collections from Fort Simpson.
Harper, Professor L.—*Ceratites americanus*, from Alabama.
Hawon, F.—Box of grasshoppers, Fort Leavenworth.
Hayes, Dr. I. I.—Skin of walrus in salt.
Hague, Henry.—Box of birds, San Geronemo, Guatemala.
Heade, M. J.—Head of Savannah blackbird (*Crotophaga sulcirostris,*) Virgin bay.
Hepburn, Jas.—Birds of Nicaragua. Box of birds and eggs, California.
Hill, M. S.—Specimens of 17-year locust, Ohio.
Hubbard, Dr.—Specimens of *Helix blandii*, from Cherokee nation.
Hubbard, Samuel.—Keg of alcoholic specimens, and nest of *Mygale*, from California.
Ilges and Sauter.—Skins of South American birds.
Jewett, Colonel E.—Ancient pottery, from Chiriqui.
Jones, Strachan.—Zoological collection from Fort Yukon and Fort Rae.
Kelsey, S. C.—Living spider from Nashville.
Kennicott, Robert.—(See *Bulkley.)*
Kluge, Dr.—Jar of crustacea from Aspinwall.
Knudson, Valdemar.—Collection of birds from the Sandwich Islands.
Krider, John.—Collection of mounted hawks.
Latimer, George.—Pair of living *Loxigilla portoricensis* from Porto Rico.
Lewis, M.—Pachnolite from Greenland.
Little, Major T. E.—Skull and vertebral column of mink, (*Putorius vison.*)
Lockhart, James.—Zoological collection from Great Slave lake.
London, Royal College of Surgeons.—Two mounted sterna of birds.
MacDonald, R.—Zoological collections from the Rocky mountains west of the Lower Mackenzie.
McDowell, U S. A., Major General.—(See *Wallen.*)
MacFarlane, Robert.—Thirty-five boxes of zoological, ethnological and other collections from the Arctic coast of America, between the mouths of the Mackenzie and Coppermine rivers.
McKee, U. S. A. Dr. J. R.—Skin of *Meleagris mexicana* from New Mexico.
Magruder, Miss.—Large moth from Washington.
Mann.—(See *Brigham* and *Mann.*)
March, W. T.—Collection of birds and shells of Jamaica.
Mayberry, Dr. E.—*Arvicola* and osteological specimens from Martha's Vineyard.
Merrick, Mr.—Stone arrowheads from Long Island.
Michener, Dr. E.—Sterna of birds.
Neufchâtel Zoological Museum.—Twenty-seven species of birds, types of Tschudi, Fauna Peruane.
Palmer, Dr. S.—Insects, plants, and fossils of Arizona.
Parsons, D. B.—Series of turtles from Belize.

Parsons, J. H.—Fossil shell from New York.
Pease, U. S. A., Captain W. B.—Two specimens of *Sesia*, Texas.
Philadelphia Academy of Natural Sciences.—Six mounted birds in exchange.
Portland Natural History Society.—Series fresh-water and land shells of Maine.
Potts, John.—Large living moth from Washington.
Prentiss, Dr. D. W.—Skin and skeletons of birds.
Pumpelly, R.—Two boxes of shells from China and Japan.
Putnam, F. W.—*Gasterosteus Wheatlandii*, from Salem.
Randall, F. A.—Five living *Menopoma Allegheniensis.*
Reeves, Mr. and Mrs. Joel.—Eggs of birds from Calumet marshes, Illinois.
Regenhofer, Dr.—(See *Vienna.*)
Rhoads, J.—Collection of birds of Panama.
Ridgway, A. E.—Monstrous chicken.
Ridgway, Robert.—Box of nest and eggs of birds, Illinois.
Ried, John.—Zoological collection from Great Slave lake.
Riotte, C. N.—Antiquities from Costa Rica.
Roome, J. H.—Porpoise skull and bird skins.
Rothrock, J. T.—(See *Bulkley.*)
Royall, Jos.—Marl from Vicksburg.
Salazar, Governor.—Two boxes of zoological collections made by Dr. A. Shcott in Yucatan.
Salem, Essex Institute.—Head of *Diomedea culminata.*
Samuels, E. A.—Goshawk, (*Astur atricapillus,*) in flesh.
Sands, Captain —(See *Bulkley.*)
Sauter.—(See *Ilges.)*
Sartorius, Dr. Charles.—Zoological collections from the vicinity of Merador, Mexico.
Sartorius, Florentin.—Collections of birds from near Merador, Mexico.
Scammon, Captain.—(See *Bulkley.)*
Schaufuss, L. W.—*Ætherea* from New Grenada, and four types of new coleoptera.
Schee, Dr. H. M.—Box of shells, Iowa.
Schott, Dr. A.—(See *Salazar.)*
Schwartz, W. F.—Birds and eggs, California.
Sclater, Dr. P. L.—Skin of *Peucæa boucardi.*
Shaffer, D. H.—Box of living ferns.
Sharp, U. S. A., Dr. Redford.—Specimens of reptiles, insects, &c., in alcohol, from Texas.
Sibbiston, James.—Zoological collections from Fort Youkon.
Siler, A. L.—Skin of *Centia rubrizona*, Utah.
Skidmore, M.—Heads of ducks.
Slagle, M.—Box of eggs of birds.
Smith, Donald A.—Five skins of Labrador birds.
Smith, W.—Living horned owl, *(Bubo virginianus.)*
Stearns, R. E. C.—Shells from Nicaragua, California, and South America.
Steindachner. Dr. F.—(See *Vienna.)*
Stickney, Mr.—Starch made in Florida from seeds of coontee, *(Zamia integrifolia.)*
Strebel, Dr. M.—Box of shells, Vera Cruz.
Sumichrast, Professor F.—Birds, mammals, and alcoholic specimens of Mexico.
Swan, J. G.—Indian curiosities and zoological specimens from Puget sound.
Tiffany, Rev. C. C.—Bottle reptiles, Arabian desert.
Totten, Dr. G. F.—Skeleton of *Procyon cancrivora*, Aspinwall.
Totten, Dr. G. F., through Captain J. M. Dow.—Skeleton of *Elasmognathus Bairdii* from Panama railroad.

Vienna Zoological Museum., through Dr. Regenhofer.—Series of Austrian Lepidoptera.

Vienna Zoological Museum, through Dr. F. Steindachner.—Series of European fishes in alcohol.

Vuille, W.—Skins and eggs of birds of California.

Wallen, U. S. A., Colonel H. D.—Skin of *Heloderma horridum,* Arizona; received through Major General Irvin McDowell.

Wallis, J. Willie—Skin of albino swallow, from Bladensburg.

Warren, General G. K.—Mounted head of Elk.

Watt, D. A.—Fishes from St. Lawrence river.

Weeds, U. S. A., Dr. James F.—Living horned frog *(Phrynosoma orbiculare,)* New Mexico.

Wernigk, Dr.—Zoological collections, Colorado and Montana.

Woltz, T. N.—Eggs of pigeons.

Woodward, R. B.—Mounted birds of California.

Wright, Charles.—Shells and insects of Cuba

Young, John F.—*Remora,* or sucking fish, from Potomac river.

Younglove, A. E.—Box of birds and reptiles, Hayti.

Zeledon, A.—Skins of birds of Costa Rica.

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